SEAMAN

KALENDER,

OR

An Ephemerides of the Sunne, Moone, and certaine of the moſt notable fixed Starres.

The Sixth edition, newly corrected and enlarged, with an abriged Table of ſines, and ſome propoſitions thereupon, concerning Arithmeticall Nauigation.

LONDON.

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To the Right Worshipfull Sir IOHN PAITON Knight, Gouernour of his Majesties Isle of *Iersey*, I. T. wisheth worlds pleasures, and Heauens happinesse.

THE Bee (*Right Worshipfull*) *by serious industrie* gathering a certaine hidden vertue from sundry sortes of Flowers and Hearbs, and making thereof (by labour and trauaile) a materiall Lumpe, namely the Hony-combe: is not therefore to be condemned by any, but rather commended of all. The Physition, of many simples making one compound medicine, doth not onely thereby reape profite to himselfe, but applauditie of others. And the studious Reader, out of many Authors doth select some chiefe principles which hee recordeth as memorials, either to profit himselfe or to pleasure others.

Of these three comparisons, the first is excellent for immitation in generall, the second very necessary for diuers in particular, and the last, (though not so highly esteemed of the common sort of people by reason of their ignorance in Artes and Sciences, yet for the good that may come thereby to a Common-wealth) nothing inferiour to the best: especially, where their study tendeth to good and vertuous exercises, or the practise and contemplation thereof to laudable Artes and Sciences. Of which Artes, namely *Mathematicall*, Nauigation being a principall member, as hauing participation in *Arithmeticke*, *Geometry*, *Geography*, *Cosmography* and *Astronomy*, or rather to say the truth, being the quintessence of them all, yea the proofe and tryall of them: for albeit that men reade or heare neuer so much of *Cosmography* or *Astronomy*, yet without practise and experience it is vnperfect: and how can perfection be attained but by sayling and transporting from place to place, thereby beholding the diuersities of dayes and nights, with the temperature of the Ayre in sundry Regions, whereby the

[illegible] by Nauigation, [illegible] may be attained: [illegible] as the *Mathematicall Sciences* are the grounds of Nauigation, so is Nauigation the onely meanes, whereby the excellency of those Arts and Sciences, are proued and laide open, to the view of the world. Therfore very aptly may Artes be deemed the mirrour of Nature, because that by Artes, the wonderfull and hidden secrets of nature are reuealed: And Nauigation may bee called the tryall of Artes, being that thereby the whole studie of Artes is prooued to be true. These reasons mooving mee, as also being many times conuersant with Sea-men and Mariners, whereby I perceiued what they (I meane the common and plainer sort of them) chiefly desired: at my best leysure I made a collection of such Tables and Rules, as I thought fittest for their purposes: and being instantly vrged by diuers to publish them, although I was very loath to aduenture my simple labours to the common view of carping censurers; yet at last (hoping well of the best, and not greatly respecting the worst) I resoluing to hazard my papers to the Presse, and (as the common custome of the world is) thinke vpon a Patron, to protect it from the malicious flaunders of malignant spirits, I presumed vpon your Worships fauour in two respects: the one in consideration that your selfe being so well acquainted in the Artes *Mathematicall*, would (though not in respect of the Author, yet for affection of the matter) vouchsafe the protection of them: The other, that being in duty bound to be at your Worships pleasure, I know not how I might shew my selfe dutifully affected better then by dedicating my (though vnpolished, yet well willing) labours to your fauourable disposing, beseeching your Worship to accept of them, and to pardon my boldnesse:

and so with my daily prayers to God for your
health and prosperous successe in all
your actions, *I rest*:

Your Worships, most dutifully to be commanded,

Iohn Tapp.

To the Courteous Readers health:

GEntle and indifferent Readers; whose iudgements are not so Sophistically mixed with humorous conceites, and quipping quidities, (as many are now a dayes) who are apter with their turbulent tongues to condemne all thinges, then with sensible iudgements to amend any thing: as for them or any such carping Zoylistes, I am indifferently perswaded to set as lightly by their partiall and iniudiciall censures, as they are farre from hauing a good opinion of ought but what is agreeable to their own fantasticall fictions: Onely to them that are of more plausible spirits and grauer iudgements, who (for the most part in reading) applaude that which is good, and passe ouer with silence that which is not hurtfull, without scoffing at the worke, or deriding the Author, and to those that hauing small vnderstanding, are desirous of more knowledge in the Art of Nauigation, and other Mathematicall studies: To the one I commit the censuring of my worke, and to the other the profit of my labours: knowing that the wise will rather winke at small faults, then rashly reproue that which may profit others, though not pleasure themselues: And though (as I say)

the curious and expert Mathematicians finde nothing therein contained which may satisfie their expectation, yet I hope they will iudge fauourably of my intention, and with patience passe it ouer for affection to the Arte it selfe, wish charitably that my skill were answerable to my will: as for the meaner sort whose experience haue not beene taxed with Artes rudiments, nor their iudgements fined with demonstratiue illustration in the Mathematicall Sciences, but onely are now (as it were) setting themselues with willing mindes to learne what they before wanted, I make no question, but as by these following Tables and Propositions they reape profit, so accordingly, in yeelding friendly censures vpon me and my workes, they shall answere my expectations with a full recompence of my passed labours. And so I leaue thee friendly Reader, to the Practise of what followeth: hoping that as it may bee profitable to all, so it can no way bee hurtfull to any.

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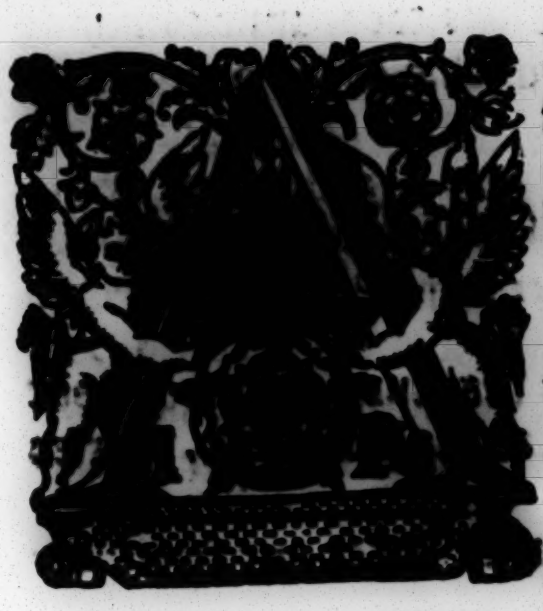
Yours to vse:

I. T.

¶ Certaine definitions, meete to be vnderstood of those that will practise *Navigation.*



Spheare or Globe, is a round figure, made by the turning of halfe a Circle, till it end where it began to be moued, by a mouing body inclosed with one playne or surface: in the middle whereof is a pricke, from which all lines drawne to the surface, are equall.

Center is the point or pricke aforesaide, in the middle of a Spheare, Globe, or other Circle.

Diameter is a right line, drawne through the Center, to the Circumference or surface of a Spheare or Circle in each side thereof.

Circumference is a round Circle, equally distant on all sides from the Center thereof.

Surface or Superficies is the vpper part of any thing.

A Degree is the 360. part of the circumference of any Circle.

A Minute is the 60 part of a Degree, beeing vnderstood of measure: but in time, a minute is the 60. part of an houre, or the fourth part of a Degree, 15. degrees answering to an houre, and foure minutes to a degree.

The Pole is a point or a pricke imagined in the Heauens, whereof are two, the North Pole and the South Pole, opposite one to another: the North Pole being the center to a Circle described by the motion of the North Starre, or the taile of the little Beare: From which point aforesaid, a line imagined to passe through the center of the Earth, and passing directly to the opposite parts of the Heauens, meeteth the South Pole.

The Equinoctiall is a great Circle imagined in the heauens: alſo deuiding the heauens into two equall partes, and lying iuſt in the middle betweene the two Poles, being in compaſſe from Weſt to Eaſt 360. degrées, euery degrée of terreſtiall meaſure, valuing 20. engliſh leagues or 60. miles.

The Meridian is a great Circle deuiding the Equinoctiall at right angles into two equall partes, paſſing alſo through both the Poles and the Zenith: to which Circle, the Sunne comming thitherward 24. houres, maketh the middle of the day, and the middle of the night.

Note that euery place hath a ſeuerall Meridian, which doe all meete together in the Poles of the world.

Zenith is a point or pricke in the heauens, right ouer our heads, 90. degrées from the Horizon, as the Pole is 90. degrées from the Equinoctiall.

Nadir is a point or pricke in the heauens vnder our féete, oppoſite to the Zenith.

Horizont is a great Circle deuiding that part of the heauens which we ſée, from the other part we ſée not.

Azimuth is a great Circle, croſſing the Horizont at right angles as the Meridians doe the Equinoctiall, being as many as the Meridians: and as the Meridians concurre and meete together in the Poles of the world, ſo doe the Azimuthes meete in the Zenith, which is the Pole of the Horizon.

Paralels are lines or Circles equally diſtant in all partes one from another, as all Circles of Eaſt and Weſt are paralell to the Equinoctiall.

Almicanterahs are Circles paralell to the Horizon, béeing alſo Circles of Altitude or elouation, being that the altitude of the Sunne, Moone, or Starres aboue the Horizon are deſcribed therby: which Almicanters doe croſſe the Azimuthes, as the Paralels or Circles of Eaſt and Weſt doe croſſe the Meridians.

The Tropickes are two leſſer Circles paralell to the Equinoctiall, limitting the bounds of the Zodiacke or the greateſt declination of the Sunne on each ſide of the Equinoctiall. The Tro-

picke

picke of Cancer northwards, and the tropicke of Capri. ſouthwards; whoſe diſtance from the ſaid Equinoctiall are 23. degrees, and 30. minutes.

The Zodiacke is a great Circle, croſſing the Equinoctiall in two oppoſite places thereof, and ſtretching it ſelfe from thence towards either of the Poles, touching the tropick of Can. on the north part, and the tropick of Cap. on the ſouth part thereof. In the zodiack are the 12. ſignes: viz, Aries, Taur. Gem. Can. Leo, Vir. Libra, Scor. Sagi. Capri. Aqua. Piſces, every ſigne being 30. degr. in length, and 12. in breadth, through which the Sunne paſſing, deſcribeth a yeare, and the Moone paſſing likewiſe through the ſame makes a month: the 12. degrees that the Zodiacke hath in breadth, is allowed for the latitude of the Planets.

Eclipticke is a Circle lying iuſt in the middle of the Zodiacke, out of which the Sunne never goeth, but the Moone and other Planets are ſometimes on the one ſide, and ſometimes on the other ſide thereof, in which the head and taile of the Dragon alſo is.

The head and taile of the Dragon, are two oppoſite points in the Ecliptick line of the zodiack, which move backward through all the 12. ſignes in 19. yeares: and it is to be noted, that if the Sunne and Moone are in Coniunction in that place of the Eclipticke where the head or taile of the Dragon is, then is the Sunne eclipſed, and being in the oppoſition, the Moone being in either of the ſaid points the Moone ſhall be eclipſed.

The Circle Articke is a circle which includeth all thoſe ſtarres which do never riſe nor ſet in any one latitude, but are alwayes above the Horizon where the North Pole is raiſed: the like is underſtood of the Circle Antarticke, where the South Pole is raiſed.

The Polar Circles are two little circles diſtant from the Poles of the world, ſo much as is the greateſt declination of the Zodiacke from the Equinoctiall: in which Polar circles are the Poles of the Zodiacke.

Colures are two great Circles paſſing through both the poles, croſſing one another in the ſaid Poles at right angles, and deviding the Equinoctiall and the Zodiacke into foure equall parts, making thereby the foure ſeaſons of the yeare. The one Colure paſſing

paſſing through the Equinoctiall points of Aries and Libra, ſheweth the beginning of the Spring time and Autumne, which two times, the dayes and nightes are equall. The other Colure paſſing through the two Solſticiall points of Cancer and Capricorne, ſheweth the beginning of the Summer and Winter: at which two times, the dayes and nights are longeſt and ſhorteſt.

Altitude in the heauens, is the height of any thing aboue the Horizon towards the Zenith.

Latitude is the [illegible] or diſtance of the Planets or Starres, from the [illegible] either northwards or ſouthwards. Alſo Latitude is the diſtance of the Zenith of any place from the Equinoctiall, towards either of the Poles, which is alwayes equall with the height of the Pole in the ſame place.

Longitude is length, and in the heauens it is underſtood the diſtance of any Planet from the beginning of Aries in the [illegible], or from the beginning of any ſigne [illegible] Otherwiſe, longitude [illegible] of any place [illegible] the Iles of Azores: [illegible] is [illegible] Longitude, is [illegible] and is [illegible] upon the Meridian.

Declination is the deviation or diſtance of the Sun, Moone or Planets from the Equinoctial, and is ſaid to be North or South according to the Pole towards which it lieth.

Amplitude is the diſtance of the riſing and ſetting of the Sun, Moone, or Starres from the true Eaſt or Weſt point of the Compaſſe upon the Horizon.

Aſcention is the riſing of any Star, or of any portion of the Ecliptick above the Horizon: Right Aſcention is the number of degrees and minutes of the Equinoctiall, which commeth to the Meridian with the Sun, Moone, Star, or any portion of the Ecliptike. Oblique Aſcention is the number of degrees of the Equinoctiall, which riſeth or commeth to the Horizon with the Sun, Moone, Star, or any portion of the Ecliptike: In which is oblique Deſcention alſo. Aſcentionall difference is [illegible] the one being ſubtracted or taken from the other.

The

The Golden number is. Prime, is the time of 19. yeares, in which time the Moone runs through all her Conjunctions, Oppositions, and other Aspects.

Epact is the 11. dayes and three houres, which exceedeth the yeare of the Moone, being 354. dayes, to make it equall with the yeare of the Sunne, which containeth 365. dayes and ¼. By the Golden number is found out the Epact: and by the Epact is found out the age of the Moone.

The Circle of the Sunne is the number of 28. whereby that in 28. yeares, all the varieties of Dominicall or Sunday letters and leape yeares, are expired, being the time the 4. yeares, the said Circle doth begin againe: therefore if this number of 28. be found out the Dominicall letter for any yeare past, present or to come: Where note, that there is but 7. letters which serue for Sunday letters, viz. A B C D E F G. And although that in the begining of the twelue, they precede according to their naturall order of the Alphabet, yet in the yeares they goe backward: as if G. be for one yeare, F. shall be for the next: and if it be a leape yeare (which is every fourth yeare) then is there two letters for the yeare, the first serueth from the first of January till S. Mathias day, which is then the 25. of February, and then the other letter takes place, and serues till the end of the yeare.

To finde which number of the Sunne's circle, and consequently the Dominicall letter for the yeare proposed; to the yeare of our Lord, adde 9. that totall deuide by 28. and that which remaines is the Circle of the Sunne for that yeare: Then to knowe the Dominicall letter; note that the 28. yeare the Dominicall letter is A. and is the third from the leape yeare: therefore the first to begin withall againe, is G F. because it is another leape yeare, & so counting the 7. letters backeward, and every fourth yeare counting two letters, that letter vpon which the number of the Sunne circle ends, shall be the Sunday letter for the yeare proposed.

As for example: The yeare 1618 adding 9 thereto, it makes 1627. that being deuided by 28 the remainer is 3. the circle of the Sunne: then counting 3 of the 7 letters backward till I haue counted 3 places, beginning with G F. thus, 1. G F. 2. E. 3. D. I finde

26
11
37
16

[illegible] 3. place euen upon D. [illegible] is the [illegible] yeare after the leape yeare.

[illegible] is to be noted, that the Prime and Dominicall letter, changeth the [illegible] day of Ianuary, and the Epact the [illegible] of March. To [illegible] which remaineth after the deuision, adde one: the product is the prime number for all that yeare.

As for example.

I would know the Prime for the yeare 1618. deuide 1618. by 19. and you shall finde in the quotient 85. and after the deuision, there rests 3. vnto which if you adde one, it makes 4. which is the Prime for the yeare 1618.

15
30
11
56
70
26
70
11
67
76

To finde out the Epact.

Adde to the Epact of the yeare past, 11. and if it passe 30. take away 30. and the remainder is the Epact for all that yeare: but a shorter way, is thus [illegible] imagining three places upon your hand, which for example shall be the 3. ioynts of one of your fingers, and calling the first ioynt 10. the second 20. the third 30. then count the Prime [illegible] upon the three ioyntes aforesaid, and going upon them [illegible] to the end of the said Prime number, marke upon which you [illegible], and adding the number of the ioynt with the Prime, if they come not to 30. that shall be the Epact for all that yeare: if they passe 30. take away 30. and the remainer is the Epact.

15
11
26

As for example.

[illegible] the yeare 1618. the Prime is 4. then imagining the first ioynt of my finger to be 10. the second 20. the third 30. And tell upon the three ioyntes 4. the Prime number, viz. upon the first ioynt I tell 1. on the second 2. on the third 3. againe, on the first 4. which is the Prime ending upon the first ioynt which I call 10. therefore adding 10. the number of the first ioynt to the Prime 4. makes 14. which is the Epact also for the yeare 1618.

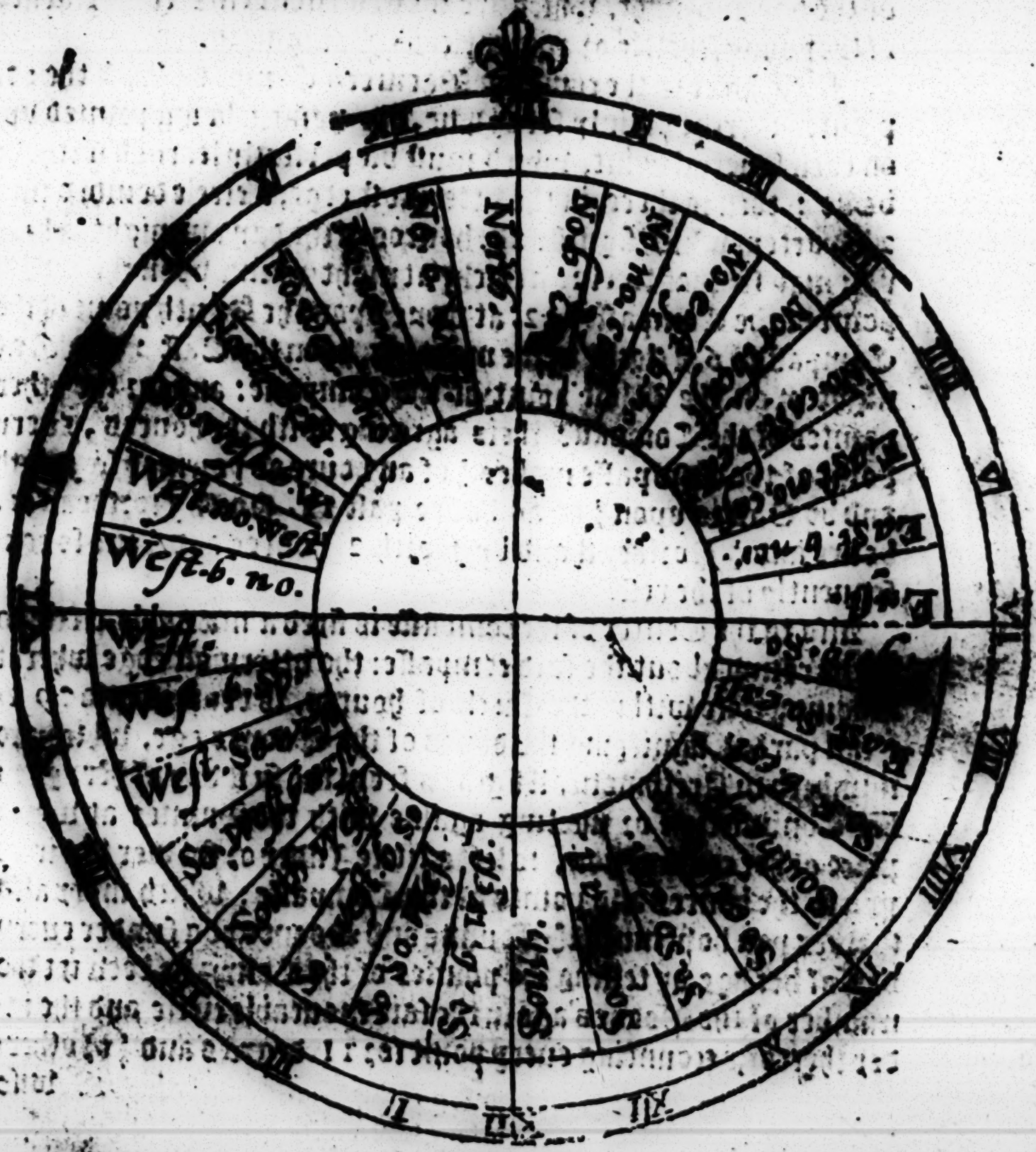
To know the Moones age.

Adde to the day of your month, the Epact, and so many dayes more as are monthes from March to the month you are in, inclu-

ding

1618

[illegible] but 30. degrees, [illegible] 30 [illegible] 9. only of the age.



A declaration of the former Instrument.

This Instrument giues you a plaine and easie order, for the shifting of the Sunne and Moone for euery day of her age, and also it is a ready and most necessary reckoning of the Tides, whereby also is shewne the common order to bring thereby the 32. points of the Mariners Compasse to 24. houres of the day and night, which are the first rudiments to be learned of the young scholler or apprentice in Nauigation.

First, here is the common Mariners Compasse with the 32. pointes thereof plainly set downe, the names being printed vpon each seuerall point, which must be perfectly learned without booke: then is there, in the vtterm̃ost edge, a circle deuided into 24. partes, which signifie 24. houres of the day and night, where you may see that twelue a cloche at night is iust vpon the North point of the Compasse: 12. at none vpon the South point of the Compasse: 6 a cloche in the morning, vpon the East: and 6. at night vpon the West point of the Compasse: and for the other pointes of the Compasse their agreeing with the houres, euery point of the Compasse makes ¼ of an houre as you may see North and by East is vpon ¼ of an houre past 12. North Northeast, 1. houre and ¼ Northeast and by North 2. houres and ¼ and so consequently of the rest.

Also to the Center of the compasse is fixed a mouable circle to turne rounds about the said compasse: the vttermost edge whereof [illegible]ouing close within the Circle of houres, is deuided into 29 equall partes, signifying the dayes of the Moones age, which are numbred in Arethmeticall figures from the first day of her age to her Coniunction or meeting againe with the Sunne: at which place of her coniunction, is left a little Index or shewer to direct you to the houres and points of the Compasse: which index also shewes you how much the Sunne and Moone are a sunder euery day of her age, by telling the pointes of the Compasse betwixt the number of the Moones age in the said moueable circle and the index thereof, accounting euery point for 11. degrees and ¼ or other-

wise

wife the number of houres contained in the vttermoſt circle, declaret the ſaid number of the Moones age and the inder: accounting euery houre for 15. degrees, ſhewes the degrees of diſtance betwixt the Sunne and Moone.

Now to keepe a reconing of the tides thereby, you muſt know by the table hereafter ſet for that purpoſe, how it flowes, that is to ſay, what Moone makes full Sea or high water at that place where you would know the time of the tide or high water for the day propoſed: which knowne, you muſt alſo by the former propoſitions, or elſe by the Kalender following, know the Moones age: then ſeeking out the number of the Moones age in the moueable Circle, place the ſaid number of the Moones age vpon that point of the Compaſſe which makes full Sea vpon the change day at your place deſired, & ſtaying it there, the inder which is in the ſaid moueable Circle, points you directly to the point of the Compaſſe that the Sunne muſt be vpon, when it ſhall be high water the forenoon day in the deſired place, and alſo in the vttermoſt fixed Circle it ſhewes the houre of the day which you deſire.

An example.

The firſt of Ianuarie 1618. I deſire all this aforeſaid: Firſt for the Moones age becauſe that the Epact changes not till the firſt of March, I adde the Epact of the laſt yeare, which is 3. and the day of the month 1. is 4. then January being the eleuenth month from March, 11. added thereto makes 15. for the Moones age the firſt of January, 1618.

Againe, to know how much the Sunne and Moone are a ſunder, the Moone being 7. dayes old, I ſeeke in the moueable Circle for the Moones age, which being 7. I place 7. vpon any certaine point of the Compaſſe, which for example is here Weſt, & the inder ſhewes the North & by Weſt, and ¼ to the Northward, which is 7. pointes and ¼ that multiplyed by a 11. ¼ the number of deg. that belong to a point of the Compaſſe, makes 87 deg. for the diſtance betwixt the Sun and Moone, and in houres it ſhewes 5, ¾ which multiplyed by 15. yeeldes the like, being very neere ¼ of the Zodiacke.

Then for the tides, at London Bridge it flowes South-weſt and

[illegible]
age, vpon the point [illegible]
able rundle there, I ſee that the index [illegible]
which is 36. min, or neere 3. quarters of an houre paſt 8. of the clocke, at which time it ſhall be high water at London bridge, the Moone being 7. dayes olde.

Againe, at Harwiche where it floweth [illegible] by Eaſt, the Moone ten dayes olde, I lay on the [illegible] vpon the point of the Compaſſe South and by Eaſt, and then the index lies the point weſt north weſt of the Compaſſe, and in the Circle of houres ½ of an houre paſt 7. which is the time of the full Sea at Harwiche, the Moone being ten dayes olde.

But if you want a Table or inſtrument to worke the account of the tides, you may doe it by memorie, multiplying the Moones age by 4. and deuide the product by 5. and to the quotient adde for euery vnity which remaines vpon your diuiſion 12. mi. that total adde to the houre that it makes full ſea on vpon the change day, the product ſhall be your deſired number, as in the firſt example.

The Moone 7. dayes old, and the high water at London on the change day, at 3. of the clocke. I multiply 7. (the Moones age) by 4. makes 18. that deuided by 5. the quotient is 5. and 3. remaines vpon the diuiſion, which 3. being ſo many times 12. min. makes 36. min. and added to 5. in the quotient, makes 5. houres 36. min. that added to 3. the houre of full Sea vpon the change day, makes 8. of the clocke and 36. minutes as aforeſaid.

The gouernment of the Planets.

Diuers writers haue diſagreed, concerning the Planitary houres, ſome making the houres of the Planets equall with the houres of ẏ clockes, and ſo continuing their Regiment orderly with the other common houres. Some againe, beginning the ſaid Planitary houres at noone, ſome at midnight, and ſome againe at the Sun-riſing: which indeed for the time of the beginning of the account is ẏ beſt, and for the difference of the equalitie and inequalitie betweene the Planitary houres, and the common houres of the clockes, Gemma Friſius agreeing with the beſt

Aſtrono-

Aſtronomers ſaith, that as the daies & nights do increaſe & decreaſe, ſo muſt the planetary houres be longer & ſhorter accordingly: neuertheleſſe ſo that there ſhall be 24 planetarie houres in the day and night, as well as of other houres, but that if the day conſiſt of more the 12. houres, the proportionally the planetarie hours to conſiſt of more then 60. minutes, and if the day be leſſe then 12 houres, the the planetarie houres to be leſſe then 60, minuts: and if the day be iuſt 12. houres, then the planetarie houres are equall to the houres of the clockes & not otherwiſe. The like is to be underſtood of ỹ nights: & to make an equalitie of the planetarie houres to them of the clockes, being that how long ſoeuer the day is, yet there muſt be 12. planetarie houres: and how ſhort ſo euer the day is, there muſt (neuertheleſſe) be 12. planetarie houres, and ſo of the night: by which you ſee that the planetarie houres, are ſometimes greater and ſomtimes leſſer then the common houres of the clockes, which alwaies conſiſt iuſt of 60. min. therefore if you deuide the day into 12. equall parts, one of thoſe parts ſhall be the quantitie of a planetarie houre, which you may doe thus: multiply the houres of the day into min. by 60. & if there be any odde minutes, ad them to the product, the totall being deuided by 12. the quotient ſhewes the number of minuts contained in an vnequall or planetarie houre.

And againe, if at any houre of the day or night you know not what planetaris houre it is, ỹ is to ſay, how many planets haue ruled ſince the beginning of the day or night propoſed: multiply the number of the houres paſt from funne riſing by 60. & deuide the product by the number of the min. contained in an vnequall or planetaris houre, the quotient will ſhew you how many houres and minuts of the planets are paſt from the funne riſing (if it be in the day) or from the funne ſetting if it be in the night: which knowne, vnder the table following to know what planet rules the day and houre propoſed, looking for the houre in that colume which is right vnder the day propoſed: thoſe planets which are gouernoures of the ſaid houres in the day time, being placed on that ſide next the left hand, and the gouernours of the night on the right hand.

Example.

The 17. day of May being Sunday at 9. of the clocke in the morning, I would know what Planet rules: First in the following Kalender, I finde that the 17. of May the day is 16 houres long, therefore I multiply 16 houres by 60. minutes and the product is 960. that deuided by 12. brings in the quotient 80. min. for the length of a Planetarie houre at that time: then from 4. of the clocke (the time of the Sunnes rising) till 9. a clocke, the houres proposed is 5. houres, which multiplyed by 80. brings 300. that deuided by 80. (the length of a Planetarie houre) brings in the quotient 3. houres and 3. quarters: so I conclude, that at 9. of the clocke, 3. Planets haue past their Regiment, & the 4. hath ruled 3. quar. of his houre: therefore vnder the title Sunday, in the top of the table, I look for 4. towards the left of the said table, against which on the left hand is placed Luna, therefore I say that the 17. of May being Sunday, at 9. of the clocke in the morning, Luna shall haue raigned 3 quarters of her houre.

Consonants of the day.	Sunday.		Munday.		Tuesday.		Wednesday.		Thursday.		Friday.		Saterday.		Consonants of the night.
Sol	1	12	9		0	10	0	11							Iupi.
Venus	2	0	10		0	11	1	12							Mar.
Mercurie	3	0	11		1	12	2	0							Sol.
Luna	4	1	12		2	0	3	0							Ven.
Saturne	5	2	0		3	0	4	1							Mer.
Iupiter	6	3	0		4	1	5	2							Lun.
Mars	7	4	1		5	2	6	3							Satu.
Sol	8	5	2		6	3	7	4							Iupi.
Venus	9	6	3		7	4	8	5							Mar.
Mercurie	10	7	4		8	5	9	6							Sol.
Luna	11	8	5		9	6	10	7							Ven.
Saturne	12	9	6		10	7	11	8							Mer.
Iupiter	0	10	7		11	8	12	9							Lun.
Mars	0	11	8		12	9	0	10							Satu.

¶ A Rutter, for the Courses round about Ireland, from Cape to Cape, and what tides it makes in euery Harbor, and how many leagues it is from Harbor to Harbor.

IN primis, from Cape-cleare to the Miſon-head, is 7. leagues, and lyeth weſt and by north, and eaſt and by ſouth, you ſhall finde a Haven northweſt from Cape-cleare, to Crooke Haven, and it floweth there eaſt northeaſt, and weſt ſouthweſt, ye muſt goe weſt to enter into it.

From the Miſon to the Durzib, is 7. leagues, and lyeth weſt northweſt, and eaſt ſoutheaſt.

Beare Haven lyeth from the Miſon-head, north northweſt 5. leagues and a halfe, you muſt goe northweſt into the Haven, it floweth eaſt northeaſt and weſt ſouthweſt: If you will anchor betweene the Durzib and the maine Land, you muſt goe without the Iland, for the eaſt ſide is not ſound.

The 3. Ilands that be of the point of the Dowrzies, which is called the Bull, the Cow, and the Calfe, they be ſound, you may goe within them or elſe betweene them, for there is no danger but what you ſee.

Dowrzies, and Blaskey lye north and by weſt, and ſouth and by eaſt, and there is betwixt them 12. leagues, the Skellocks is betweene both, and it floweth northeaſt and ſouthweſt.

Northeaſt of the great Skellocks a 3 leagues off, you ſhal finde the entry of Vallens, you muſt runne eaſt ſoutheaſt to enter in, it floweth eaſt northeaſt, you muſt borrow of the Iland to enter

in, for the point of the eaſter ſide is long.

North northeaſt of the great Scellocks 6. leagues of, you ſhall finde the Haven of the ventry, which is a good road: it ſlowetheaſt nor theaſt.

N.E. by N. of the great Scellocks 7. leagues you ſhall finde the haven of Dinggell, and without the Haven is a roske called the Croo, which is ſound on both ſides: the rocke doth not couer but on a ſpring tide, you muſt run northweſt and by weſt into the Haven, it ſloweth eaſt northeaſt and weſt ſouthweſt.

The ventry and the ſound of Begue lyeth ſouth by eaſt and north by weſt 3. leagues, and when you are paſt into the ſound of Begue, you muſt lye Eaſt and by north into the Rode againſt a redcliſt which is on the ſouth ſide.

Southeaſt of the ſound of Blaskey a 6. leagues of, you ſhall finde a good harbor named Begue, which is to the northeaſt of Valence, the ſaid Haven hath two entryes, but the weſt ſide is the beſt, you muſt take heede of a ſuncke rocke which is on the Iſlands ſide which you muſt leaue on your Larboord ſide going in, and it ſloweth northeaſt northeaſt and weſt ſouthweſt.

You ſhall vnderſtand that the ſaid ſound of Blaskey, lyeth ſoutheaſt and northweſt, but you muſt take heede of a ſholde that is on the eaſt ſide a thwart of the Sezebras.

From Blaskey to Smerrick is 3. leagues, and if you enter into the Haven, you muſt goe ſouthweſt into it: it ſloweth eaſt north eaſt and weſt ſouthweſt.

There is a Hill to the eaſtward of Smerrick, which is called Sinbrandon goe from Smerrick northeaſt by eaſt & you ſhall go with Lopus-head, wch maketh entry of the River of Lymerric. on the north ſide, there is from one to the other 10. leagues

Smerwick and the head of the Kerry, lye eaſt northeaſt and weſtſouthweſt 7. leagues aſunder and there is within the Bay 3. Iſlands called Saltire.

From Lompſhead to the Scatryes is 7. lea. they lye eaſt N.E & W. S. W. and if you enter into the river, take heed of a ſholde ſtone lying betweene Lompſhead and an Iſland called Scattick, which

you

you muſt leaue on the Northſide, and to the Eaſtward of that Iland, is a good road: it floweth eaſt northeaſt, and weſt ſouthweſt.

From Scatricke to Quoine is fiue Leagues, you muſt goe Eaſt, and you ſhall finde two Ilands, they be flat Ilands, goe you to the northwards hard aboord them, and from thence run eaſt northeaſt, and you ſhall finde a Rock called the Bieffe, goe hard aboord the ſouth ſide of the ſaid Rocke called the Bieffe.

And when you are at the ſaid Rocke, you muſt rowe Southeaſt, and you ſhall finde another Rocke called the ſmall Bieffe, then goe with the Iland of the entrie of Dorſey, and burroſſe aboord the Ilands, as neere as you can for feare of the Banke going into the Hauen, and you muſt moore at the Caſtle by foure Cables, for there goeth a great tide, it floweth eaſt northeaſt and weſt ſouthweſt.

The Sound of Blaskey, and the Ilands of Arrin, lyeth northe northeaſt, and ſouth ſouthweſt, and there is betweene them 16. leagues: the Ilands lye eaſt and weſt, and makes the entrance of Galloway and of the other Ilands: there is one which is naught, but the weſt ſound is good, and the next ſound to it is good, which is called the little ſound, but the ſound comming from the eaſt, is naught, but the next cõming to the Black ſhore from the eaſt, is partly good, but you muſt put the two particions to the Iland, for it is dangerous: You muſt vnderſtand that there is one Iland in the courſe way, betwixt Lampſhed and the entrie of Galloway, that hath a great Rainie, a league and a halfe off the maine land.

If you goe before the towne of Galloway, goe aboord the Black ſhore, and bring the Black ſhore ſoutheaſt of you: then goe northeaſt, and you ſhall fetch an Iland called Morton Iland, and there is betweene them both three leagues: you muſt not truſt to the north ſhore, for there is a ſholde halfe way to the Black ſhore, and the Iland of Morton is thwart of two white points, which is on the north ſide.

The ſaid ſholde is vpon the weſt ſouthweſt ſide of the ſaid Iland of Morto a league & a halfe of at a ſpring tide, then ſhal you

ſee it drie, and it floweth at the ſaid Iland, eaſt northeaſt and weſt ſouthweſt.

The ſound of St. Gregory and the Rode of Galue, lyeth eaſt northeaſt and weſt ſouthweſt, and there is betwixt them 8. leagues.

The ſound of S. Gregory and Slins head, lye ſoutheaſt and northweſt and the diſtance betwixt them is 9. leagues.

Slinſhed and Black-rock lie ſouth by eaſt and north by weſt, and are diſtant 15. leagues.

Black-rock is an Iland which is weſt of Kill-head, a league of the Cape: the ſaid Black-rock and the Staggs lyeth northeaſt and ſouthweſt, and are diſtant 12. leagues.

From the ſaide Black-rock, runne North and you ſhall finde the Iland of Eaſt Bundey, and there is betweene them 2. leagues.

Southeaſt of the Staggs there is a Hauen called Broad hauen: from the Hauen to the Staggs is 4. leagues: the Staggs is a Cape that maketh the entry of the Riuer of Raſſen, they lye eaſt and weſt, and are diſtant 8. leagues: the Staggs and the Cape of Tellen lyeth northeaſt and Southweſt and are diſtant 15. leagues.

Betwixt the Staggs, and the Cape of Tellen in the Baye is the Hauen of Moye, the Hauen of Porrway, the Hauen of Slego, the Hauen of Balleeſhennen, the Hauen of Dongall, the Hauen of Kellegego, and the Hauen of Tellen.

The Cape of Tellen, and the Iland of Arron, lye north northeaſt and ſouthweſt, and are diſtant 7. leagues.

The Iland of Raghlenborne, and Tellen, lye ſouthweſt and northeaſt and are diſtant 2. leagues.

The Iland of Raghlenborne, and the Iland of Torre, lye North northeaſt and South ſouthweſt, and are diſtant 14. leagues.

To the Eaſtward of Torre, is a Cape called Horne-head, and are diſtant 2. leagues: ſoutheaſt of Horne-head is a Hauen called Sheep-hauen, it floweth eaſt and weſt, but you ſhall haue in the Baye a good roade for all Windes: the ſaid Hauen is a broad Hauen, and is two leagues from the Cape.

Horne-

Horne-head and the entry of Loughfoile, lye Eaſtnoztheaſt, and weſt ſouth weſt, and are diſtant 6. leagues.

The entrie of Loughfoyle, and the Iland of Enerſter-houlde, lyeth Noztheaſt and ſouthweſt, and are diſtant fiue leagues.

The Iland of Fotre, and the Iland of Enerſter-houlde lyeth Eaſt and by Noꝛth, Weſt and by South, and are diſtant 9. leagues.

The entrie of Loughfoyle, and Eneſter-hould, lye ſoutheaſt and noꝛthweſt and are diſtant 5. leagues.

The Iles of Enerſter-hould, and Skerris Portruſh, lye Eaſt ſoutheaſt and Weſt noꝛthweſt, and are diſtant 10. leagues.

You muſt underſtand that the Riuer of Loughfoyle lyeth from Skerris portruſh, weſt ſouthweſt, and eaſt noꝛtheaſt, and there is betwixt them, the Riuer of the Bond: there is betwixt Portruſh and Loughfoyle, 5. leagues: There is in the entry of Loughfoyle, a Racke which is called the Tonnes, which is dangerous for any ſhippe of charge, alſo there is a Chaunell of the Eaſt ſide of the Tonnes, hard aboard the ſhoꝛe, but you muſt haue your tide: It flowеth eaſt by ſouth, and weſt by noꝛth: Skerris portruſh and it, lyeth ſouth and noꝛth and are diſtant 12. leagues.

Skerris portruſh, and the Ilands of the Raghlins, lye noꝛtheaſt and by eaſt, and ſouthweſt by weſt, and are diſtant fiue leagues, it flowеth in Skerris eaſt ſoutheaſt, and weſt noꝛthweſt, the flood commeth from the Eaſtward.

Aff the Raghlens is a Cape called the faire Forland, and betwixt them is a league and a halfe, the faire Forland and the Knee lyeth ſouth ſoutheaſt, and noꝛth noꝛthweſt, and are diſtant 9. leagues.

The faire Forland and Loughrian in Scotland, lye eaſt ſoutheaſt, and weſt noꝛthweſt, and are diſtant fiftene leagues.

There is betwixt the Knee and Carickuergus, fiue leagues.

The point of Loughrian, and the Ilands of Commoras of Scotland lye nozth and south, you muſt paſſe by Elliſo, and by the hauen of Lambach aſunder 7. leagues.

The point of Loughrian and Copnam Iles, lieth nozthealt, and south weſt.

The Knee and the Rocke of the Maydens, lye nozthealt by nozth.

The Knee and Ellſe in Scotland, lye nozthealt by eaſt, diſtant 10. leagues.

Loughrian in Scotland, and the mould of Galue, lyeth south South eaſt, and nozth nozthweſt, and are diſtant 7. leagues.

The Mould of Galue, and the Calfe of Man, lie south southeaſt and nozth nozthweſt, and are diſtant ten leagues.

The Copman Iles, and the roade Carricke Vergus, lye eaſt and weſt, and are diſtant 4. leagues, it floweth in the ſownd eaſt southeaſt, and weſt nozth weſt.

Copman Iles and the point of the Moulens, lye south southeaſt, and nozth nozthweſt, and are diſtant 7. leagues.

The point of the Moulens and the Ile of Lambay, lye south southweſt, and nozth nozthealt, and are diſtant 21. leagues.

Lambay and Carlingford, lye nozth nozthweſt, and south southealt, and are diſtant 1 .leagues.

Lambay and the Ile of Dalke, lye south southweſt, and nozth nozthealt, and are diſtant 5. leagues.

The bank of Wiclo beginneth thwart of the Fozth of Dublin and containe to the Ile of Tosker, they lye nozth by weſt, and south by eaſt, and they lye in length 24. leagues.

Tosker and the point of the Grenord, lye caſt and by nozth, and weſt and by south, diſtant 2. leagues.

And when you are bound to the eaſtward of the Grenord, you muſt kéep the Mountaine of Waſhford aboue the lowe land, and ſo you ſhall goe cléere of all the dangers betwixt you and the ſhoze: and if you cloſe the Mount with the lowe land, then you ſhall goe with the dangers.

Tosker and the Cape of Canwall, lye south by eaſt, and nozth by weſt 40. leagues.

Tosker

Tosker and the Salts, lye east northeast, and west southwest; distant 6. leagues.

The Salts and Silly, lye south and north, and are distant 33 leagues.

The Salts and the Tower of Waterford, lye east and west, distant 5. leagues.

The Tower of Waterford and the Ile of Ballecutin, lye southwest and by west, and northeast by east, but betweene the Tower of Waterford and Ballecutin, is a Hauen called Yoghal, and a Seabord, it is an Iland called Capell Ile, and betweene Capell Iland and Ballecutin is 4. leagues.

The Tower of Waterford and Heluick-head, lyeth east and west, distant 3. leagues.

Capell Iland and the Iland of Ballecutin, lye west southwest, and east northeast, and are distant 3. and a halfe leagues.

Ballecutin and Corke Hauen, lye west by south, and east by north, and are distant 3. and a halfe leagues.

Oyster Hauen and the Oldhead of Kinsale, lye southwest and northeast, distant 3. and a halfe leagues.

The Hauen of Kinsale lyeth from the Oldhead north northeast, and going in, you must keepe Bane Castle open of the west land.

The Oldhead and Cape Cleare, lye west by south, and east by north, and are distant 14. leagues.

Cape Cleare and Silly, lye east southeast, and west northwest, distant 50. leagues.

There lyeth from Fasten a hauen called Crocke hauen, and is from it northwest, distant 4, leagues.

There is a hauen called Scoll hauen, which lyeth from Fasten north and by west, distant 5. leagues.

There is a head-land, halfe way betwixt the Oldehead of Kinsale and Baltemore, which is called Kendoneteda, and it lyeth northwest by west, from it is a good hauen called Clendor, there is a high land to the eastward, you must goe aboard that high land, and so into the hauen. There is a raine of Rockes on the west land, that goeth to the eastwards, therfore keep the east

side,

the Castle, there lyeth west northwest from the said head, a good Haven called Castlehaven, 4 leagues from it: and if you come out into the Sea, and méete with the Staggs, you must goe northeast into Castlehaven, and in the entry there is an Iland which you must leaue on the east side of you, and another flat Iland which you must leaue on the west side of you: you may goe into the water from it to the mayne, for it is very nigh to the west land, but be holde on the easter Iland, and goe right with a Chappell that lyeth on the east side of the mayne Land, and when you are thwart of the Chappell, you shall see a Castle of the west side, and thwart of the Castle you may enter in 12. fatham, it is from the Staggs 3. and a halfe leagues.

You must understand that the flood shoots from Dorze to the Old head of Kinsale north northeast, and the ebbe to the contrarie, and from the Old head to the Tower of Waterforde, northeast and southwest, and from the Dourze to the northwards, north northeast and south southwest.

If you will goe in betwixt the Cash and the North-head of the grounds into Dalky, you must hang a round hill that standes like a Sugar loafe north northwest, and then you shall haue 10. fatham: It floweth southeast alongst the Channell and the barre of Poulback, there is 8. fote water vpon it at low water, and 3. fatham at full Sea: your barre lyeth South and North, and you you shall haue in the roade of Poulback 14 fote at low water.

To sayle from Dalky to the of Poulback, you must kepe a small Rocke open, a hand spicke length, and when you come to the barre, you must lye west southwest vp into the roade within the Beacon, then must you Anchor in 4 fatham at high water, for there be two Hills, on the south side, a high hill and a lowe round hill, bring them both in one, and you be in the best of the Rode. A South southeast Moone, makes full Sea.

A Note

A Note for going into Dublin.

If you come for Milford, you must leaue all the Flands to the Weſtwards, and when you haue the Graſham North northweſt, then the Maiden beareth Northeaſt by North, and when you come into Dall Rode, you may ride in 3. fatham and a halfe at low water: it floweth eaſt by North.

Milford goeth in cloſe vnder Cowein and Scabon, by the Eaſtwards, and when you come open of Milford, you ſhall ſee all Stars like the Mawſtone, which lyeth on the Eaſt ſide, and in Dall rode you may ride for all windes, the Small lyeth from the Graſham 3. leagues, and Southerneſt from lyeth a reefe of Rockes, which at low water, it lyeth midway, it is very dangerous comming betweene them.

A Gene-

A Generall & Compendious tide-Table, shewing what Moone makes full Sea or high water, in all these places following.

Full Sea on the Coastes of Zutphen, Friezland, Holland, Zealand, and Norway.

222
888
224
8 0 0

At the Iutlandish Iles before the Riuers of Heuer, Fyder, and Elue. S. and N.

At Enchuisen. S. and N.

The Ile of Vrk before Delfe-Ile, at Emden, & all the shores of Flanders. S. and N.

Before the Maers deep. E. and W.

At Hambrow and Antwerp. E. and W.

Underneth Holiland, W, S.W

At Egmount and Harlem. W.S.W

In the Bressond and Vourd. W. S.W.

Before the eastern & westerne entrances of the Emes, or riuer of Emden, before all the Coast of Friezland and the Flye. S.E.

Before the Ghest of Texel. E. S. E.

Upon the Flats of West Friezland, Wyering, and Amsterdam. S.W.

Without the bankes of Flanders. S.W.

Dodrecht and Zericke Sea. S.W.

Roterdam, and from Harlem to the Riuer of Maes. S.W.

At Ward-house. E. and W

At Brihac. E, S. E.

Cape Gallant. S. by E.

The Hauens of Yotland and Norway. S. and N.

At Corpus Christi point. S. S-W.

Before the Fen in the channel, at Horne, Edam, Ile of Gore, before the Maes, before Canser and Teruer. S. S. W.

Before the Willing and all the Coast of Zealand. S. S. W.

North Cape and Blangbrow. S.W.

Fox nose, and Saint Nicholas roade. W. S. W

Ful Sea on the coaſt of *France*, *Spayne*, and *Portugall*.

AT Blackneſſe, Armuy, Ramnckins, and Camſer. S.S.W

Within the Foſſe of Cane. s.s.E.

Calice road, and Diepe. s.s.E

At Boleine, Calice, Grauelin, & Dunkerk, halfe tide. s. and N

The Iland of Baſſe. s.E

Within the Seine, before the Caſquets, before Garnſey. s.E

Before Cherbotough and the Raſe of Blanquet. s. & N

At Newport halfe tide, s. & N

At Seine head, s.s.w

At Garnſey, and before Saint Poule, w.b.s

Belliſſe and Holy Ile, s.w.b.s

Without Vſhant, and before Burdeaux, E. and w

Brittaine, Penmarke, Poiton, and Gaſcoine. s.w

Race of Fountnes, s.w.b.w

Bloy and S. Mathews, w.s.w

Abrowrath, and Saint Malowes, w.b.s

Before the Killiats, s.w

Portwiſe, and before the riuer of Burdeaux, s.w

From the Race to the Pole-head, s.w

Before the riuer of Naunts, and before the Bay, s.w

In the Baye within Vſhant, w.s w

At the Sept. Iles, and at Calice in the Creeke, w.s.w

Within the riuer of Roane, & frō the Pole head of Burdeaux to the Forland of Fountains, before Brouage, in the riuer within all the hauens afore ſaid it flowes. s.w.b.w

At S. Iohn de luze, s.s.E

At Concalo, and Saint Malo, E. & w

At Cape Saint Maries. s.E.b.E

On all the coaſt of Biskay, Galizia, Portugall and Spaine, it flowes, ſouthweſt, and northeaſt.

Scotland.

[A]t S. Magnes ſound. s.E.b.E

At Faire Iles. s.E

In the Frith, s.s.E

Faire Ile Rodes. s.b.E

At Orkney. s.E

England.

AT Barwick it flowes, s.s.w

At the Staples halfe tide. N.E.by N

At Howncliffe fote halfe tide. N.E.by E

At Flam-

At Flambro-head one quarter tide. E.N.E
At the Shoo, s.& N
At Tinmoth one quarter tide, s.w
At the Sporne. w.b.s
Newcastle & Humber, w.b.s
Winterton, E.s.E
Blacke täile and the Nowre, s.b.w
Blackney & the shields, E.& w
Yarmouth, s.E b.E
Orford and Albrow, s.E.b.s
Whitbay and Robin-hoods bay. s.w
Before Hartlepoole, s.w
Scarbrow one quarter tide. w.s.w
Hull and Lin halfe tide, E.& w
Before Hũbers mouth, N.w
At Burnham one quarter tide, E.& w
Cromer. s.E
At Liestow quart.tide, s.s,E
Harwich & Douer, s.s,E
Harwich within, s,b.E
South Forland, s,s.E
Before Margate and Thames mouth, s,b.E
Ligh & Kentish knock, s,& N
Spirits & along ỹ Swine, s.& N
Betwene Tinmouth & Flambro head, s.w
Betweene Flambro head and Bridlington-bay, s,w.b.w
Betweene Bridlington & Lawrenas, w,s,w
Betwéene Lawrenas and Cromer a long the well, halfe tide, E,& w
Betwéne Cromer and Yarmoth rode, s.E
Betwéene Laisto rode and Orfordnes, s.E.b.s
Betwéene Orford and Orwell wanes, s,s,E
Betwéene the Naze and the Ware head of Colne, s,b,E
At the west end of the Nore s,b,w
Rochester and Maldon s,b.w
At Grauesend, s,s,w
London and the midst of the heads or straights s,w
At the north Forlands, s,s,E
At Beachy s,& N
Seauen cliffes s,E
In the Downes, s,s,E
In the Camber and at Gote-end, s,b.E
At Cambernes and at the Needles. s,E,b.s
In Cambernes-rõde s,s,E
Porchmouth, Hampton and the Ile of Wight S,& N
In the Offing from the north Forland to the South Forland, it runneth halfe tide, and from the south Forland to the Nasse, it rũneth halfe tide, and halfe quarter tide, and from the Nasse to Fairly

one halfe tide, & from Fairly to Beachy one quarter tide vnder other.

At Portland rode, E,S.E
At S. Ellens S,E,b.E
Within the Race of Portland, at Poole in the Hauen, at Homehead, and thwart of Plimouth and Dartmouth, S,E
At Waymouth E,& W
At Famouth, Foy, Fourne, Plimouth & Dartmouth, W,b.S
Briſtow and Foulnes, E,b.S
At the Start, E,b,S
Mouſhole, W,S,W
S. Dauids head, E.& W
Milford Hauen E.S.E
Ile of Man and Catnes. S.E
Three leagues of the ſhoze, at ỳ Lizard to the ſhoze, and to the Lands end, E.S.E
Within Torbay and in the Bay of Carnaruen W.b.S
At the mouth of Seuerne, W.b.S
At the Moonles W.b.S
From the Lizard to the Sorlings. W.b.S
Before Silly in the Channell E.& W
At Silly halfe tide S.S.W
Within Mounts Bay, and in the Sea of Wales and Seuerne W.S.W
At Lundy and the Holmes of Briſtow E.& W
In the Sleeue betwæne Silly and Vſhant S.& N.

Note that the flood ſetts in at the eaſt end of Wight till a ſoutheaſt Mone: in the rode of Dungeneſſe ſouth ſoutheaſt, but without in the Chanell a ſouthweſt Mone full Sea: from the Seames, and in the broad ſound betwæne it and Vſhant, the flood runneth eaſt northeaſt, and waſt ſouthweſt.

Ireland.

AT Caldy W.by S
Waterford and Abermorick. E.& W
At Cape-cleare E.S.E
Macknels Caſtle S.E.b.E
Dublin & Lambay S.E.b.E
Dunbar and Kildien S.E
Dungaruin, Kinſale, Corke hauen & Baltemore, W.S.W

¶ The Course of all the Coastes of Holland, Zealand, France and Spayne, vpon what Point, and in what distance they are.

From the Ile of Texell vnto Egmont	S. & by w. leagues 5
From Egmont vnto the Maze.	s. s. w. l. 11
From the Maze vnto the Wieling.	s. w. l. 12
From the wieling vnto the head or strait betweene Douer and Calice.	w. s. w. l. 18
From ỹ Ile of walcerē or Flushing vnto Calice.	s. w & b. w. l. 22
From blackneſſe vnto Deepe	s. s. w. l. 12
From Deepe vnto Seyne head, or the River of Seyne,	w. s. w. l. 11
From the Seyne head to the River of Cane.	s. w. l. 8
From thence vnto Cape de la Haugue.	N. w. l. 12
From thence vnto the Caskets.	w & by N. l. 8
From the Caskets to Garneſey.	s. w. & by w. l. 4
From Garnſey to S. Malo	s. s. E. l. 10
From Garnſey to the ſept Iles.	s. w. & by s. l. 12
From the ſeauen Iles to S. Poul.	w. s. w. l. 8
From thence to the Fourne.	w. s. w. l. 10
From the Caskets to the Fourne.	s. w. & by w. l. 34
From the Fourne to S. Mathews point.	s. s. E. l. 3
From thence to Fontenau or Fonteynes.	s. & by E. l. 5
From Vſhant to the ſeams, Doubard it.	s. l. 7
From Fontenau to the weſt Penmarques.	s. E. l. 7
From thence vnto the Ile of Croy.	E. & by s. l. 12
From the weſt Penmarques, to Bel Ile.	E. s. E. l. 15
From thence to Heys ſomewhat more eaſterly.	s. E. l, 12
From thence againe vntill within Piquilier,	E. & s. l. 10
From thence againe vnto Croyſill,	E. & by s. l. 9
From Piquilier vnto Heys,	s. & by w. l. 5
From Heys to the Kiliats,	E s. E. l. 10
From the Ile of Heys to Porthuis.	s. E. & by E. l. 12

From

From S. Martins Iland to the burning Ile	s.E.& by E l.3
from the burning Ile to the Dysher banke	s.s.e:l:3
from S. Martins Ile to the Towre of Cordam	s,& by e,l,12
from thence vnto Bayone	s,&,N,l,28
from Bayone to Orio.	W,s,W,l,5
from Orio vnto S. Ion de Luz	E,s,E,l,6
from Orio vnto S. Andrew	W,& by s,l,20
from S. Andrew to Cape de Pennas	E,& W,l,30
from Cape de pennas to Ribadeo	s,W,& by W,l,12
from Cape de pennas to Ortegal	W,& by W,l,20
from Ortegal vnto Ribadeo	s,E,l,14
from Ortegal vnto the Ile of Cizaega	s,W,& by W,l,13
from Cizaega vnto Coronna	E,s,E,l,6
from thence vnto Cape de Coriana	W,s,W,l,10
from Coriana to Cape Finisterre	s,& N,l,3
from Finisterre vnto Bayone	s,E,& by s,l,14
from Bayone vnto port de port	s,s,E,l,18
from Port de Port to Aueiro	s,& N,l,8
from Aueiro to Montega	s,s,W,l,5
from Montega vnto Barlinges	s,W,l,12
from Barlinges vnto Roxende	s,& by E,l,12
from Roxende to S. Vues point	s,E,& by s.l,8
from thence vnto Cape S. Vincent	s,& N,l,24
from thence vnto Pharo	E,& W.l,14
from Pharo vnto Lepe	N,E,& by E,l,12
from Pharo to Saltees	E,N,E,l,18
from Saltees to Chipiona	s,E,l,8
from Chipiona to Calis Malis	s,E.l,6
from Calis vnto the straight of Gibraltar	s,E,l,8
from Calis vnto Cape de Cantin	s,W,by s,l,60
from Cape de Cantin to the Ile of Madera	W,l,104
from Cape S Vincent to Madera	s,w,& by w,l,115
from Roxende to Madere	s,w.l,130
from Roxende to the Ile of Tercera	w,l,210

The Courses of England, Ireland, and Scotland.

From Boecknes vnto Leeth in Scotland	s.s.w.l.28
From Leeth vnto Barwicke	s.s.E.l.8
From Barwicke vnto the Holy Ile	E.s.E.l.4
Frō S.Abbes head to the eastern side of Farne Iles	s.E.l.6
From the Iles of Farne to the Tees mouth	s.s.E.l.16
From the riuer of Tees to Flamborough head	s.E.& by E.l.14
From Flamborough head to Blackney	s.E.l.18
From Blackney vnto Winterton	s.E.l.8
From Winterton vnto Lestoff	s.& by E.l.8
From Lestoff vnto Orford Hauen	s.l.7
From Orford vnto the Foreland	s.s.E l.13
From the Foreland to Douer	s.l.5
From Douer to the Shingles, or the Nesse point	s.w.&.b.w,l.7
From the Nesse point vnto the Beache	w.s.w.l.6
From the Beache to the Ile of Wight	w:& by s:l:15
From Wight vnto Portland	w,& by s:l,10
From Portland to the Start point	w:s:w:l:14
From the Start vnto Ramhead point	w:n.w:l:6
From Ramhead vnto Dodmans point	w:sw:l:8
From Dodmans to the Lizard point	s,w:& by w,l.6
From the Lizard to the Iles of Sillye	w:l:12
From the Lizard to the lands end	w:n,w:l:8
From the Lands-end to the Ile of Lundy	n,e.l:14
From thence vnto the Holmes of Bristol	n:e,& by e,l:16
From thence vnto the Ile of Caldie	w:s:w,l:25
From thence to the Iles of Salteys, on the Coasts of Ireland,	w: n:w:l:20
From Salteys to Cape Cleere	w:s:w:l:25
From Cape Cleere to the Ile of Dorsey	w:l:12
From the point of Dorsey to the Ile Blakem	n:n:w:l,16
From Blakem vnto the Iles of Arran	n,n,e,l:14
From the Iles of Arran to Galwicke or the Galse in Ireland, east	n.e.l:6

Of divers and ſundry Courſes over the Weſterne Sea.

From the Texel on the Coaſtes of Holland, to Flamborough	w:n:w.l.45
From Texel vnto Winterton in Norfolke	w.l.32
From the Ile of Texel vnto Leſtoffe	w.& by s.l.28
From the Riuer of the Maze, in ſouth Holland vnto Harwich,	w l.26
From the ſaid Maze to the Forland of England	w.& by s.l.25
From the Marſdeepe in S. Holland, to ỹ ſaid Forland	s.w.l.36
From the ſaid Marſdeepe to Calico	w.& by s.l.38
From Douer vnto Bolloyne	s.e.l.8
From Bolloyne vnto the Beache	w.l.16
From the Beache to Deepe in Normandy	s.e.l.18
From Deepe vnto the Ile of Wight	e.s.e.l.28
From Wight to the Seyne head or mouth	s,e.l.20
From the ſaid Riuer of Seyne to Portland	w.n.w.l.30
From the Ile of Wight vnto the Caskets	s.w.& by.s.l.14
From Garnſey vnto S. Malo in Normandy	s.s.e.l.8
From the Caſkets to Portland	n.& by w.l.10
From the Caskets to the Start point	w.n.w.l.16
From the Start to the Sept Iles in Normandy	s.s.e.l.24
From the Start to S. Poul in Normandy	s,& by w,l,22
From S. Poul to Portland	n.e,& by n,l.32
From the Fournes to Ramhead	n,n,e,l.28
From the Start point vnto Vſhant	s,w,& by s,l.32
From the Fourne to the Lizard	s,& w,l.22
From Vſhant to the Iles of Silly	n,n,w,l.26
From the Sorlings to Milford Hauen	n,& by e,l.25
From the Sorlings to Wexford in Ireland	n,n,w,l.34
From the Sorlings to Cape Cleare	n,w,l.42
From Cape Cleare to Cape de Finiſterre	s,& n.l.130
From the Lizard to Cape de Finiſterre in Galizia	s,s,w,l.112
From Vſhant vnto the Ile of Cizarga in Galizia	s,s,w,l.89

from Vshant to Laredo in Biscay	s,s,e,l,85
from the Seames roches to S. Sebastian in Biscay	South East & by S,l,10
from Vshant againe to Cape de Pannas in Biscay	South and N.l,70
from Bel Ile vnto Ortegal in Galicia	s,w,l.75
from S. Martins Ile to Ortegal	w,s,w,l.85
from Ortegal to Cape de Coriana	s,w,& by w,l,24
from Cape de finisterre to the Iles of S. Michael	w,s,w,l,185
from S. Michael to the Ile of Tercera	n,w,l,26
from Cape de finisterre to the Ile of Medera,	south west & by w,l,190
from madera vnto the great Ile Canarie	s,e,by e,l,60
from Cape de finisterre to Bayone in Galicia	s,e,& by e,l,15
from Cape de finisterre to the Ile Barlinges	s,& n,l,50
from the Barlinges in Portugal to the Ile Canarie	s,s,w,l,170
from the Ile of madera to Calis malis	e,n,e,l,150
from Calis to Cape de Cantin	s,w,& by s,l,65
from Cape de S. Vincent to Cape de Cantin	s,& n,l,62
from Cape de Vincent vnto the Ile of madera,	South west and by west, leagues 120
from Roxen in Portugal vnto the Ile of Tercera,	e,& w,l,210

The courses of Norway, Swedeland, and East-finland.

From Schuytenes to the Vesteen,	S.& by E.l.4
From Vesteen or Wostone to the Iedder	s.s.E.l.4
From the Iedder to the Vorsteen or Forstone	s.E.l.5
From the Forstone to the Noes	E.s.E.l.6
From the Noes vnto Reperwicke	E.N.E.l.8
From Reperwicke to Mardon	N.E.l.10
From Mardon vnto Iofferland	N.E.l.8
From Iofferland to Langhesondt	N.N.E.l.1
From Langhesondt to Ferderoes	N.E.& b.E.l.6

From

From Ferderoer vnto Soen water,	N.1.6
From Ferderoer vnto Roeghe,	N.N.E.1.4
From Ferderoer vnto Akersond,	E.N.E.1.6
From Akersond to Maesterland,	s.E.& b.E.1.4
From Paternoller to Nydrinke,	S.E.1.8
From Nydrinke to Waerberghe,	S.E.& b.E.1.4
From Waerberghe to Swedoroer,	s.s.E.1.6
From Swedoroer vnto Col,	s.s.w.1.3
From Col vnto Lappesand,	s.E.1.3
From Lappesand vnto Ween,	[illegible]
From Ween to Drakerriffe,	s.& b.E.1.7
From Drakerriffe to Steden.	s.& b.w.1.4
From Steden vnto the north end of Bornholme,	East and by north leagues 15
From Bornholme vnto Anno,	N.& b.w.1.8
From Anno vnto the Rocks,	N.E.1.8
From the Rocks vntill within the Calmersond.	North North-east leagues 10
From Calmersond to the Sweedish Ionckfrow,	N.N.E.1.8
From Ionckfrow to Landsoort,	N.N.E.1.8
From thence vntill before Dorysholen,	N.E.& b.E.1.8
From the Stockholms Scharet to view of Abo,	North-east and by north leagues 24
From View vnto Luns vtschares,	E.N.E.1.28
From the Vtschares to the Ile Pursagro,	E.& b.N.1.30
From thence vnto Somere,	E.& w.1.9
From Somere to the Red-hole of Wiburgh,	N.E.1.9
From the Red-hole to Traelland,	N.E.& b.N.1.2
From thence vnto Wiburghe.	leagues 3

The Depthes and Soundings, nere diuers Prouinces. And firſt of Gaſcoigne, Poitou, and Britaine.

VVIthout the Riuer of Bourdeaux, there is 14. fatham depth, but when you come within the ſight of Cordam Tolose, 30. fatham.

Diuer againſt the Coaſt of Poictou, 16. leagues without Oleron you haue 25. fatham, but comming nére the land 8. leagues from the ſame, you haue 35. fatham: In the Chamell betweene Porthurs and Heys, it is 30. fatham, and aſmuch in the Chamell of Heys: as alſo betweene Heys and Belile, without the Chamell is 35. fatham, but within 25. without Heys, twe Leagues off there is found 45. fatham.

Eleuen ſiue leagues Southwards of Belile, is 70. fatham, but 9. leagues from the Northmoſt point of that Iland towards the Southweſt is 60 fatham: and nere againſt the midſt of Belile, in 40. fathoms depth you ſhall find land, In your courſe betweene Belile and the Seames, you may come no nerer then 50. or 45. fathoms, if you ſayle from Belile Weſt and by North: When you are againſt Gloyland, you ſhall finde 60. fathoms depth, without, and within the Seames of Gloyland to the Northwards, you haue 40. fathoms water, in 60. fathoms depth, without the weſt Penmarkes you may ſayle Northweſt by Weſt without the Seames, but by night come no nerer then in 55. fathoms, for the ground is groſſe and red ſand full of rounde ſtones: halfe a league Weſt ſouthweſt of the Seames is a lodge of rocks, where you haue 7. fathom depth, but betweene the Seames and the Rocks is 50. fathom.

In the Chamell betweene the Seames and Vſhant is 55. fathom depth, the ground is groſſe and red ſand, with little rounde ſtones red and black: Where to Vſhant is 45. fathom, but within it is of a conuenible depth: ſouthweſt almoſt 6. leagues of Vſhant,

you

you haue 70. fatham, and the ground is fine white ſand, with little white ſhelles, and other ſmall things like needles, then there is Vſhant Eaſt from you, but if the ſand be groſſe and white, mingled with great & white ſhels, then it is Southeaſt from you, but if you doubt of theſe grounds, goe Northerly, if your ſound be deeper, then are you towards the Seames, but if not ſo deepe, then are you in the Channell almoſt North of Vſhant.

Betweene Vſhant and Obeuracke in the trade it is 60. fatham depth: betweene Vſhant and the Sorlings in the midſt of the Channell there is 70. fatham: betweene the Seames and Vſhant in 70 fatham water, the ground is of little blacke ſtones eaſie to be broken and of yellow earth or clay, but if you finde red and hard ſand, go Northward till you happen on white ſand mingled with long ſtreakes, and then you are in the Channell.

If from Cizarga you ſayle North northeaſt in the Spaniſh Seas towards Vſhant, and finde your ſelfe in 80. fatham, you are 14. or 15. leagues of Vſhant, but comming nearer, you ſhall haue 70. fatham water and be 10. leag. from Vſhant, but if you finde the ground to be yellow ſhelles and little blacke ſtones, then are you toward the Seames, therefore you muſt with the ſhip beare off Northward to ſhun Vſhant vntill you finde white ſand, and things like needles, for ſuch are the grounds of the Channell.

Betweene Vſhant and the Ile of Baſe, when you ſayle at 4. fatham water, you are foure leagues off the ſhoare, but by night come no neerer then 25. fatham: when you are tenne leagues off Obueracke, you ſhall finde 25. fatham depth, but 8. leagues off the Sept Ilands you haue 55. fatham.

A league without the Rocks of Obuerack, there is a blinde or hidden Rocke, ſo that if you are to ſayle vpon aboard betweene the Fournes, and Obuerack, come no neere the blinde rocke then 40. fatham, but Eaſtward you may ſayle in 30, or 25. fatham.

If a Ship ſayling W. S. W. and ſouthweſt by weſt of Silly, at 80. fatham water, be found to be vnder 49. degrees 15. min. of Altitude, ſhe is 26. leagues from land, and muſt goe Eaſt and by North till ſhe get 66. fatham water, for then ſhee is in the Channel betweene Silly and Vſhant, and then if ſhe be bound for

England,

[illegible] Southward, and betwéene the [illegible] Lizard [illegible] fatham depth.

The ſoundings and grounds betweene *Ireland*, *England*, and *Normandy*.

THree Leagues without the Iles of Dorſey neare Ireland, it is 45. fatham déepe, in the Channell betwéene Dorſey and Cape-cleare is 42, or 43. fatham, the channell from Cape-cleare to Saltees hath 45. fatham, but two Leagues off Ireland it hath but fortie: betwéene Saltees and Milford it is 44. fatham déepe, and betwéene Lundy and Silly 38, fatham: In the midway betwéene Silly and Milford is 44, but North of Silly 40, and 42: and néere England by the Lands end, the Channell is of 50, fatham déepe.

Comming from Cape Finiſterre ſayling N. N. E. if you haue 80 fatham, you are 20 leagues off the ſhoare, and the ground is ſmall blacke ſtones with great red ſand: In the ſame courſe, when you haue but 60 fatham, you are within 12 or 14 leagues of the ſhoare, but ſhall not ſo ſoone ken land as you thinke for: you ſhall a great while haue 60 fatham: being at the N. partes of the channell about Silly: betwéene Vſhant and Silly, the channell is 70 fatham: on the S. ſide of Silly, the ground is ſmall red ſtones, and fine white ſand. Over againſt the Lizard and Falmouth 4 leagues from ſhoare is 52 fatham, betwixt Foy and Plimouth ſound, in the channell nigheſt is 60 fatham, betwéene the Lizard and the Start, beare no nearer the ſhoare then 35 fatham, you may caſt anchor in the [illegible] channell in 25 fatham, and ſo ſhall you lye within the Forcland ſtreame: betwéene Plimouth and the Sept-Iles, in the midſt of the channell is 55 fatham, but 4 leagues S. S. W. off Plimouth is but 35. fatham, S. S. E. of the midland of the Start is 45. fath. but from thence 5 or 6 leag. S. E. is 54 fath. in the channell betwéene the Caskets and Portland, is 40 fatham, and a league N. of the Ile of Aldernay is a hole or pit 80 fatham déepe, all the reſt of the channell betwéene Portland and Aldernay is of equall depth viz, 40 fatham: when

you

you are within hearing of Portland, your sounding is 34 fath. and 3 leagues off Wight 36 fatham; also 2 leagues Eastward of Beachy, betweene Picardy and Wight the channel in the midst is 38 fathom, betweene Winchelsey and Picardy 24. fatham, the shoales betweene the heads called the Vrowensand, hath but three fathom and a halfe, but on the south side of it, is 24 fatham: and in all the faire way betweene Zealand and Douer, it is 24 fatham deepe.

Depths of the North Sea from the *Foreland.*

IN the Chamell from Englands Foreland, and sands of Flanders you haue 24 fatham deepe: but 3 leagues N. W. by W. of the Countrey of Zierrickze called Botbrecke, it hath but 4. fatham depth: without the shoald the channell of Zealand is 26. fatham N. W. of Harlem, 8, or 9, miles within the sea, there beginneth a shelfe called de breed Verthien, reaching alongst the Coast of Holland to the plaine of Ameland, where it endeth: over against Harlem and Egmond, is 13, 14, or 15. fatham, and the ground is full of Dale, mingled with black sand like mustard seede: the said shelfe hath 15, 16, or 17 fatham depth: betweene Texell and Vlyeland, where the ground is grosse red sand, 6, or 7 leagues from the shoare, for there the shoald is narrower then it is towards the N. end of the channell: without the shoald betweene Zealand and Texell is 26 fatham deepe, as farre as the shoald which the Fishers call Dogsand. In the channell on England side, over against Yarmouth is 35 fatham, but against Flamborough and Scarborough point 38 fatham, whereas the white shelfe called Dogsand beginneth, reaching into the South seas to the channell of Helichland: this shoale where it is within hearing of Flamborough point, hath but 9 or 10 fatham, but when in the same sand you finde 12 fath. then Texell is from you southeast, almost 30 leagues, but when you are come to 16 fath: then are you within 21 leagues, south southeast of Vlyeland.

A Ship that comes from the Riffe, finding 18. fatham depth

off

on the aforesaid sand, is then 20. leagues South and by East of Vlyeland, but at 22 fatham, must then sayle towards the Vlye South and by west, and south southwest: but if in the Channell of Helichland, 24. or 26. fatham be found, then must your sayle Southwest, and southwest by South, and then you come to the Schellingh, but if in Helichland sound you have 27. fathom, then are you altogether to the Eastward of it: betweene the Riffe and the Doggersand, the channell is 26. fatham: without the channell Westward, it is 32. fatham deepe.

A Ship that comes out of the English Straights, or out of Zealand, having at the Riffe 24. fatham, is from the Naes in Norway 18. leagues North by east, but having 20. fatham, is 16 leagues from it North: and finding but 18. fatham, is then 18. leagues off it North by West: the course from thence to the Holmes is 12. leagues North by East: from thence to the point of Scakghens 18. leagues Northeast by east, there is a Roche of one fatham depth, North-east, and north-east by East of the Holmes, two leagues from shoare.

Depthis neere *Iutland* and *Ameland*.

IN the Sea without Iutland, a mile from Dodenberg, is a banke called Reefe-horne, stretching out 8. leagues West by South, in some places but three fatham deepe, and in some places may be sayled over, and because a Reade for a North-west and a north winde in 20. fatham: from Ameland towards the sea, the ground is grosse sand, red and blacke, mingled with shelles: thence Southwards in 16 fath. sayling 3. houres, you shall come to the mouth Sea of Ameland, where the ground is fine sand, with shelles: North from Schellingh in 24. fathom, is fine white sand, and in 8. fathom white and blacke sand mingled. Vlyeland hath white sand with shelles, and thin blacke sand in 16 fatham depth: from the west end of Vlyeland is great ambred sand mingled with blacke like unto Mustard-seed, about five or seaven leagues from shore: at the east end of Schellingh towards, at 18. fathom is fine white sand mingled with blacke, having

in

in it things like pibbles. Ouer againſt Borcke in the Weſterne Emes at 17. oꝛ 18. fathom depth, a land may be ſeene, the ground is graſſe grauelliſh ſand; at 14. fathom may Ameland be ſeene, but Schellingh at 15. and Vlyeland at 15 oꝛ 16. fathom water. At the North Hooke of Texel, land may be ſeene at 16, fathom. Holland at 14, oꝛ 15. when you ſayle within the ſhoald called the Breduerthien, which beginneth Northweſt of Harlem, and ſtretcheth alongſt the Coaſt of Holland, to the Weſt end of Vlyeland, and is 7. oꝛ 8. leagues from the ſhoꝛe.

Soundings and ground neere the *Schaw*.

A Great league Weſt by N. from the Schaw, is 35. fathom depth: North N. E. a great league off the corner of this point is 38, fathom, and when the point is north-eaſt from you, then you haue 17, fathom. Betweene this point and Leſon, the Channell is 20, fathom deepe, and the ground like clay oꝛ dirt: betwixt Anhout and Waerſbergh, in the midſt of the Channell is 22. fathom water: betweene Leſon and Anhout, the ground is fine and ſandy: neere Waerſbergh is a ſhoald of 17. fathom depth: betweene Anhout and Coll is another ſhoald of 17, fath. where ſometime it is troubleſome like a whirlepoole.

Depths of the Eaſterne Seas.

BEtweene Oeland and Gothland, the ſoundings are vnequall ſometimes of 20. ſometimes of 23, fathom, the ground graſſe and blacke ſtonie ſand, like peaſe: when the South end of Oeland is fiue leagues from you weſtwards, you haue 27, fathom, where alſo you may gage water: but when the Chappell in Sudernoorden beareth Weſt, N, W. of you, then haue you 31, fathom, and ground fit to gage water: ouer againſt the Rocke in the ſame way is 52, fathom, and a clay ground, but fit for gaging: betweene the greater and leſſer Carra is 14, fathom, vnder which is ſafe roade for ſhipping: there is a ſhoald betweene Hoeberg and Oſtergard

Ollergard 24 fatham deepe, the ground [illegible] but hardly from thence [illegible] Godhand [illegible] there is alſo to the eaſtward another ſhoald of 36 fatham, which when you are paſt, you haue no more then 40 fatham water: when the point of Kogh is 3 leagues ſouth eaſt from you, then haue you 30 fatham: but when it is from you halfe a league ſouth ſouth eaſt, you haue but 15 fatham: the grounde is white ſand: but when it beareth weſt a ſmall league from you, then you ſhall find 16 fatham: ouer againſt Heel halfe a leag. from the ſhore, it is almoſt 3 fath. déepe: the roade for ſhips at Heel hath 25 fatham depth: betweene Moan and Falſterborne is 14 fath. depth, betweene Stead and Falſterborne, in the very Channel is but 12 fath. deep, neare Falſterborne it is full of ſhoalds, but neare Stead you haue 13 fatham water: betweene Derkeriffe and Southolmen, which is more ſhoaldy, there is 5 fatham wanting two foote: from thence toward the ſound it is ſometime deeper, 6, 7, 8, 9, or 10 fatham.

A note of certaine and moſt dangerous places in the Sea.

The principall and moſt perilous of all, is the Maelſtream-well or ſlorp, called the Mouskſtreame; which lyeth on the backſide of Norway in 68 degrees on the Northſide of an Iland or Rocke called Weeray. This well draweth the water vnto it ſelfe during the whole flood (which is the ſpace of 6, houres and 12 minutes) with ſuch an indraught and force, and with ſuch a noyſe, through the tumbling & falling of the waues and ſtreames one vpon the other, that it is rather to wonder at then to write of, So that during that time, with in the ſpace of more then two leagues round about that Rocke of Mouſk (vnder which that water floweth) no ſhip or other veſſell may come neare, for they ſhould to their vtter deſtruction be drawne into it and ſwallowed vp: but all the time of the ebbe the water is ſo ſtrongly caſt vp againe, that no kinde of ſubſtance or mettell, how heauy ſoeuer it be, can there ſinke. So that our Northern Fiſhers at that time vſe with their Iollen or fiſhing boates, take many and

ſtrange

ſtrange fourmed fiſhes, which they draw into their boats with hookes & lines which they haue ready layde for that purpoſe: for that during the ebbe, they cannot returne into the gulphe nor get vnder the water by any meanes.

The Northerne people that inhab[illegible] aboute theſe Rockes, doe thinke that that ſtreame paſſeth away vnderneath a part of Norway vnto the North bottom in Eaſt-finland; becauſe in that place there is likewiſe ſuch a Maelſtream (though not altogether ſo ſtrong nor dangerous) where the like fiſhes are taken: and the water is in like ſort troubleſome, as it is vnderneath and about the Rocks of Mousk.

Wherupon many experimented Pilots doe call the ſaid Slorp the Nauell of the Sea, which cauſeth the courſes of the Ebbes & Flouds about al the Lands that are on this North ſide of the Equinoctiall, as the moſt conuenient place for that purpoſe to ſpreade the waters South, North, Eaſt, and Weſt, that is to ſay, Northerly towards the Pole Articke, South Eaſterly on the backſide of Ruſſia and Tartarie, towards the ſtraight of yͤ great ſouth ſea called Mar del Sur, wherin the ſpicerie Ilands called the Molluccas, neare the Equinoctiall are lying ſouthward toward the North ſea of theſe Low Countries: as alſo on the backſide of Scotland and Ireland, towards yͤ Spaniſh and Atlanticke Seas, and towards the Northweſt beyond Izland towards Furbuſhers ſtraicts, where it is thought the way vnto Catay may be found.

There are moreouer to be feared vpon the Weſterne Seas verie dangerous ſtreames and gulphs, as is the Race of Portland where oftentimes hapneth ſuch turning and tumbling of waues and ſtreames, that the ſhips which paſſe that way are many times in great perill.

Moreouer the race of Blan quert betwéene Normandy and the Iles of Alderney roareth and rageth ſo dangerouſly, that many ſhips fall therein headlong, ſo deepe, that ſodenly they are ſwallowed vp and ſunk vnto the very bottom.

The race of Fountney is more dangerous then all theſe, wherin many ſmall veſſells and barks of Brittany and of other countryes,

[illegible] are [illegible] and [illegible] : and the [illegible] of the Garrone, called the [illegible] of Bordeaux betweene the [illegible] of Gordam, and the [illegible] and [illegible] Aſſes, is likewiſe very perrilous, [illegible] many ſhips doe often perish there, if the Pilots be not skilfull and well acquainted with the place.

Now theſe aforeſaid being the moſt full of danger, it behoueth each Pilot or Maſter to haue eſpeciall knowledge thereof, and great care to preuent the danger that may enſue vnto them thereby.

¶ The yeares for which the Tables of the Sunnes place and Declination following ſerues.

Firſt.	Seco.	Third	Leape yeare.
1617	1618	1619	1620
1621	1622	1623	1624
1625	1626	1627	1628
1629	1630	1631	1632
1633	1634	1635	1636
1637	1638	1639	1640

Hereafter

Hereafter followeth a moſt excellent, neceſſarie and compendious Kalender, ſhewing the Prime, Epact, Dominicall letter, Leap yeares, and moouable Feaſts, for 24. yeares, Inclufively comprehending therwith the true day & houre of the Moones Coniunction or change, for 19. yeares to come, with the true place of the Sun, and his Declination from the Equinoctiall, both Northwards, and Southwards, vpon euery degree thereof, through the 12. monthes of the yeare.

Year of our Lord	Prime.	Epact.	Sunday Letter.	First Sunday in leat.	Easter day.	Aſcent. day.	Whit-ſunday.	Trinity Sunday.
1616	2	22	G F	Feb. 18	Mar. 31	May 9	May 19	May 26
1617	3	3	E	Mar. 9	Apri. 20	29	Iune 8	Iune 15
1618	4	14	D	Feb. 22	5	14	May 24	May 31
1619	5	25	C	14	Mar. 28	6	16	23
1620	6	6	B A	Mar. 5	Apri. 16	25	Iune 4	Iune 11
1621	7	17	G	Feb. 18	1	10	May 20	May 27
1622	8	28	F	Mar. 10	21	30	Iune 9	Iune 16
1623	9	9	E	2	13	22	1	8
1624	10	20	D C	Feb. 15	Mar. 28	6	May 16	May 23
1625	11	1	B	Mar. 6	Apri. 17	26	Iune 5	Iune 12
1626	12	12	A	Feb. 26	9	18	May 28	4
1627	13	23	G	Mar. 11	Mar. 15	3	13	May 20
1628	14	4	F E	2	Apri. 13	22	Iune 1	Iune 8
1629	15	15	D	Feb. 22	5	14	May 24	May 31
1630	16	26	C	14	Mar. 28	6	16	23
1631	17	7	B	27	Apri. 10	19	29	Iune 5
1632	18	18	A G	18	1	10	20	May 27
1633	19	29	F	Mar. 10	21	30	Iune 9	Iune 16
1634	1	11	E	Feb. 23	6	15	May 25	1
1635	2	22	D	15	Mar. 29	7	17	May 24
1636	3	3	C B	Mar. 6	Apri. 16	25	Iune 4	Iune 11
1637	4	14	A	Feb. 26	9	18	May 28	4
1638	5	25	G	7	Mar. 5	3	13	May 20
1639	6	6	F	27	Apri. 14	23	Iune 2	Iune 9

Ianuary hath 31. dayes.

The Prime			Fast.	Len. of ☽ day. H.M	☉ in ♈ Leap yeare D.M.	☉ in ♈ Leap yeare D.M.	South Declination	☉ in ♈ First yeare D.M.	☉ in ♈ First yeare D.M.
viii. 6	1	A	Newe	7 52	1 20 40	21 54		1 21 26	21 48
	2	B	yeres d.	7 54	2 21 41	21 45		2 22 27	21 38
2. xvi.	3	C		7 58	3 22 42	21 35		3 23 28	21 28
	4	D		8 0	4 23 43	21 25		4 24 29	21 17
v. 8.	5	E	Fast	8 3	5 24 44	21 15		5 25 30	21 6
	6	F	Twelfe	8 6	6 25 45	21 4		6 26 31	20 55
1 xiii.	7	G	day.	8 9	7 26 46	20 52		7 27 32	20 43
ii. 10.	8	A	Lucian.	8 12	8 27 47	20 40		8 28 33	20 31
x. 17.	9	B		8 15	9 28 49	20 28		9 29 35	20 18
	10	C		8 18	10 29 50	20 15		10 ♒ 36	20 5
xviii. 3.	11	D		8 21	11 ♒ 51	20 1		11 1 37	19 51
vii. 4	12	E		8 24	12 1 52	19 48		12 2 38	19 38
	13	F	Hillari.	8 28	13 2 53	19 34		13 3 39	19 23
2. xv.	14	G		8 32	14 3 54	19 20		14 4 40	19 9
	15	A		8 36	15 4 55	19 5		15 5 41	18 54
iiii. 2.	16	B		8 40	16 5 56	18 51		16 6 42	18 39
xii. 11	17	C		8 43	17 6 57	18 35		17 7 43	18 23
ix. 5	18	D		8 46	18 7 58	18 20		18 8 44	18 8
6. i.	19	E		8 49	19 8 59	18 4		19 9 45	17 51
	20	F	Fabian	8 52	20 9 59	17 47		20 10 45	17 35
	21	G	Agnes.	8 55	21 11 0	17 31		21 11 46	17 18
5. xvii.	22	A	Vincēt.	8 58	22 12 1	17 14		22 12 47	17 1
	23	B		9 0	23 13 2	16 57		23 13 48	16 44
vi. 4.	24	C		9 2	24 14 3	16 39		24 14 49	16 26
	25	D	Conuer	9 4	25 15 4	16 22		25 15 50	16 9
3. xiiij. 2. ij	26	E	of Paul.	9 6	26 16 5	16 4		26 16 51	15 50
11. iii.	27	F		9 9	27 17 5	15 45		27 17 51	15 31
5. xi	28	G		9 12	28 18 6	15 26		28 18 52	15 12
xix. 4.	29	A		9 15	29 19 6	15 8		29 19 52	14 54
	30	B		9 18	30 20 7	14 49		30 20 53	14 34
2. viii.	31	C		9 21	31 21 8	14 30		31 21 54	14 15

Iannuarie

of the Sunne.

☉ in ỹ second yere		☉ in ỹ third yere.	
D. M.	D. M.	D. M.	D. M.
1 21 11	21 49	1 20 55	21 52
2 22 12	21 40	2 21 56	21 43
3 23 13	21 30	3 22 57	21 33
4 24 14	21 20	4 23 58	21 23
5 25 15	21 8	5 24 59	21 12
6 26 16	20 57	6 26 0	21 0
7 27 17	20 46	7 27 1	20 49
8 28 18	20 34	8 28 2	20 37
9 29 20	20 21	9 29 4	20 24
10 ♒ 21	20 8	10 ♒ 4	20 11
11 1 22	19 54	11 1 5	19 58
12 2 23	19 41	12 2 7	19 45
13 3 24	19 27	13 3 8	19 30
14 4 25	19 12	14 4 9	19 16
15 5 26	18 58	15 5 10	19 2
16 6 27	18 42	16 6 11	18 46
17 7 28	18 27	17 7 12	18 31
18 8 29	18 12	18 8 13	18 16
19 9 30	17 56	19 9 14	17 59
20 10 30	17 39	20 10 14	17 43
21 11 31	17 23	21 11 15	17 27
22 12 32	17 6	22 12 16	17 10
23 13 33	16 48	23 13 17	16 52
24 14 34	16 31	24 14 18	16 35
25 15 35	16 13	25 15 19	16 18
26 16 36	15 55	26 16 20	15 59
27 17 36	15 36	27 17 20	15 41
28 18 37	15 17	28 18 21	15 22
29 19 37	14 59	29 19 21	15 4
30 20 38	14 40	30 20 22	14 44
31 21 39	14 20	31 21 23	14 25

South Declination

Certaine of the moſt notable fixed Starres of the 1.2.& 3. bignes, their Magnitude, Declination, and right aſcention: whereby you may readily find when any of them are in rule for obſeruation.

1

Whales taile is a ſtarre of the 3 bignes, whoſe declination is 20. degrées 12. minutes ſouth, and the right aſcention therof is 24. minutes of an houre.

2

Whales back of the third bignes, declination 12. deg. 20. minutes ſouth, and right aſcention 50 minutes.

3

Rams horne is a ſtarre of the third bignes, whoſe declination is 17. degrées, 17 minutes noꝛth, and his right aſcention is 1 houre 32. min.

4

Rams head of the third bignes, declination 21. degrées 33. minutes noꝛth, right aſcention 1. houre 46 minutes.

February hath 28. dayes.

The Prime				Leng. of the day.	Declination and true place ☉ in ♒ Leapeyere			☉ in ♓ First yere		
				H.M.	D. M.	D, M,		D.M.	Đ.M	
2. viii.	1	D	Fast.	9 30	1 22 9	14 10		1 22 54	13 5	
7. xvi.	2	E	Purific.	9 33	2 23 9	13 50		2 23 55	13 35	
	3	F	of Mary	9 37	3 24 10	13 30		3 24 56	13 14	
v.	4	G		9 41	4 25 11	13 10		4 25 56	12 54	
xiii. 12.	5	A	Agathe.	9 45	5 26 11	12 50		5 26 57	12 34	
	6	B		9 50	6 27 11	12 29		6 27 57	12 13	
4. ii.	7	C		6 54	7 28 12	12 8		7 28 58	11 52	
x.	8	D		9 58	8 29 12	11 47		8 29 58	11 31	
	9	E		10 2	9 ♓ 13	11 26		9 ♓ 58	11 10	
8. xviii.	10	F		10 6	10 1 13	11 5		10 1 59	10 48	
2. vii.	11	G		10 9	11 2 14	10 43		11 2 5	10 26	
	12	A		10 12	12 3 14	10 21	South Declination.	12 3 59	10 4	
7. xv.	13	B		10 15	13 4 14	9 59		13 4 59	9 42	
	14	C	Valent.	10 18	14 5 14	9 37		14 6 0	9 20	
10. iiii.	15	D		10 22	15 6 15	9 15		15 7 0	8 58	
3. xii.	16	E		10 26	16 7 15	8 53		16 8 0	8 35	
i. 6.	17	F		10 30	17 8 15	8 30		17 9 0	8 13	
	18	G		10 34	18 9 15	8 7		18 10 0	7 50	
5. ix.	19	A		10 37	19 10 15	7 44		19 11 0	7 28	
xvii. 11.	20	B		10 40	20 11 15	7 22		20 12 0	7 5	
	21	C		10 46	21 12 15	6 59		21 13 0	6 42	
	22	D		10 50	22 13 15	6 36		22 14 0	6 19	
2. vi.	23	E	Fast.	10 54	23 14 15	6 13		23 15 0	5 55	
xiiii. 11.	24	F	Mathias	10 58	24 15 15	5 49		24 16 0	5 32	
2. iii.	25	G		11 2	25 16 15	5 26		25 17 0	5 9	
xi. 5.	26	A		11 7	26 17 15	5 3		26 18 0	4 45	
	27	B		11 12	27 18 14	4 39		27 18 59	4 22	
1. xix.	28	C		11 16	28 19 14	4 16		28 19 59	3 58	
	29				29 20 14	3 52				

When it is leapyeare February hath 29. dayes and then is S. Mathias the 25. day

Of the Sunne.

	☉ in ♒ second yere		☉ in ♒ third yeare	
	D. M.	D. M.	D. M.	D. M.
1	22 31	14 0	22 24	14 6
2	23 40	13 40	23 25	13 45
3	24 41	13 20	24 26	13 25
4	25 41	13 0	25 26	13 4
5	26 41	12 4	26 26	12 44
6	27 42	12 20	27 26	12 24
7	28 42	11 58	28 27	12 3
8	29 43	11 36	29 27	11 42
9	♓ 43	11 15	♓ 28	11 21
10	1 44	10 53	1 28	11 0
11	2 44	10 31	2 29	10 38
12	3 44	10 10	3 29	10 16
13	4 44	9 48	4 29	9 54
14	5 45	9 26	5 29	9 32
15	6 45	9 4	6 30	9 10
16	7 45	8 41	7 30	8 48
17	8 45	8 18	8 30	8 24
18	9 45	7 56	9 30	8 2
19	10 45	7 33	10 30	7 39
20	11 45	7 11	11 30	7 17
21	12 45	6 48	12 30	6 54
22	13 45	6 25	13 30	6 31
23	14 45	6 2	14 30	6 8
24	15 45	5 38	15 30	5 44
25	16 45	5 15	16 30	5 21
26	17 45	4 52	17 30	4 58
27	18 45	4 28	18 29	4 34
28	19 44	4 5	19 29	4 11

South Declination.

5

Bulls eye is a ſtare of the firſt bignes, whoſe declination is 15. degrées 38, minutes nozth, and right aſcention 4, houres 13. minutes.

6

Orions left foote of the firſt bignes, declination 8, degrées 42, minutes ſouth, right aſcention 4, houres 55, minutes.

7

Orions left ſhoulder of the ſecond bignes, declination 5, degrées 56, minutes nozth, right aſcention 5, hour. 4, minutes.

8

Firſt in Orions girdle of the ſecond bignes, declination 8 minutes ſouth, right aſcention 5, houres 12 minute

9

Orions right ſhoulder of the firſt bignes, declination 6 degrées 17, minutes nozth, right aſcention 5, houres 34 minutes.

March hath 31, daies.

The Prime.				Leng. of the day.	Declination and true place. ☉ in ♈ Leape yeare				☉ in ♈ First yere				South Declination. / North Declination.
				H. M.	D.	M.	D.	M.	M.	D.	M.	D	
	1	D	Dauid.	11 20	1	21 14	3	30	1	20 59	3	35	
8. viii.	2	E		11 24	2	22 14	3	6	2	21 59	3	11	
xvi. 11.	3	F		11 28	3	23 13	2	42	3	22 58	2	47	
	4	G		11 32	4	24 13	2	18	4	23 58	2	23	
	5	A		11 36	5	25 13	1	55	5	24 57	2	0	
10. v.	6	B		11 40	6	26 12	1	30	6	25 57	1	36	
1 xiii. ii. 6	7	C		11 44	7	27 12	1	7	7	26 57	1	13	
	8	D		11 48	8	28 11	0	43	8	27 56	0	50	
8. x.	9	E		11 52	9	29 11	0	21	9	28 55	0	26	
xviii. 7.	10	F		11 56	10	♈ 10	0	4	10	29 55	0	2	
	11	G	Grego.	12 0	11	1 9	0	28	11	♈ 54	0	22	
	12	A		12 4	12	2 9	0	52	12	1 53	0	45	
8. vii.	13	B		12 8	13	3 8	1	15	13	2 53	1	9	
xv. 9.	14	C		12 12	14	4 7	1	38	14	3 52	1	32	
	15	D		12 16	15	5 6	2	2	15	4 51	1	57	
iiii.	16	E		12 20	16	6 5	2	25	16	5 50	2	19	
xii. 6.	17	F	Edward	12 24	17	7 5	2	49	17	6 49	2	42	
	18	G		12 28	18	8 4	3	13	18	7 49	3	6	
5. i.	19	A		12 32	19	9 3	3	36	19	8 48	3	30	
ix. 10.	20	B	Benedi.	12 36	20	10 2	3	59	20	9 47	3	53	
	21	C		12 40	21	11 1	4	22	21	10 46	4	16	
xvii. 6.	22	D		12 43	22	12 0	4	45	22	11 45	4	39	
	23	E		12 47	23	12 59	5	9	23	12 44	5	2	
[illegible]. vi.	24	F	Fast.	12 50	24	13 58	5	32	24	13 43	5	26	
[illegible]. xiiii.	25	G	Anuntiation of	12 54	25	14 57	5	54	25	14 42	5	48	
iii.	26	A		12 58	26	15 55	6	17	26	15 41	6	11	
	27	B	Mary.	13 3	27	16 54	6	40	27	16 39	6	34	
9. xi.	28	C		13 6	28	17 53	7	3	28	17 38	6	57	
xix. 3.	29	D		13 10	29	18 52	7	25	29	18 37	7	19	
	30	E		13 14	30	19 50	7	47	30	19 36	7	42	
viii. 10.	31	F		13 20	31	20 49	8	9	31	20 35	8	3	

March.

of the Sunne.

	☉ in ♈ second yere				☉ in ♈ third yere			
	D.	M.	D.	M.	D.	M.	D.	M.
1	20	44	3	41	20	29	3	47
2	21	44	3	18	21	29	3	24
3	22	43	2	54	22	28	3	0
4	23	43	2	30	23	28	2	36
5	24	42	2	6	24	28	2	12
6	25	42	1	43	25	28	1	49
7	26	42	1	18	26	28	1	25
8	27	41	0	56	27	27	1	1
9	28	40	0	32	28	26	0	38
10	29	40	0	8	29	26	0	14
11	♈	39	0	16	♈	25	0	10
12	1	38	0	39	1	24	0	34
13	2	38	1	3	2	23	0	57
14	3	37	1	27	3	22	1	21
15	4	36	1	50	4	21	1	44
16	5	35	2	13	5	20	2	8
17	6	34	2	36	6	19	2	31
18	7	34	3	0	7	19	2	54
19	8	33	3	24	8	18	3	18
20	9	32	3	48	9	17	3	42
21	10	31	4	10	10	16	4	4
22	11	30	4	33	11	15	4	28
23	12	29	4	56	12	14	4	50
24	13	28	5	19	13	13	5	14
25	14	26	5	42	14	12	5	37
26	15	26	6	5	15	11	5	59
27	16	24	6	28	16	9	6	23
28	17	23	6	50	17	8	6	45
29	18	22	7	13	18	7	7	8
30	19	21	7	36	19	6	7	30
31	20	19	7	57	20	4	7	51

South Declination.

North Declination.

10

The great Dog is a ſtarre of the firſt bignes, whoſe declination is 16 degr. 12 minutes ſouthwards, and his right aſcention 6. houres 27. minutes.

11

The little Dog is a ſtarre of the firſt bigneſſe, declination is 6. degrées 13, minutes north, right aſcention 7, houres 18 minutes.

12

Waighteſt in Hidra is a ſtar of the ſecond bignes, declination 6, degrées, 53 minutes South, right aſcention 9, houres 8 minutes.

13

Lyons hart of the firſt bignes, declination 13 degrées 55 minutes North, right aſcention 9, houres 57 minutes.

14

Lyons neeke of the ſecond bigneſs, declination 21 degrées 52 minutes North, right aſcention 9, houres 46 minutes.

Aprill hath 30. dayes.

The Prime				Leng. of the day.	Declination and the place ☉ in ♈ 1 Leape yeare					☉ in ♈ 1 Firſt yere			
				H. M.	D.	M.	D.	M.		D.	M.	D.	M.
	1	G		13 30	1	21	4	8		1	21	33	8 25
xvi. 4.	2	A		13 34	2	22	46	8	53	2	22	32	8 47
	3	B		13 38	3	23	45	9	15	3	23	30	9 9
v.	4	C	Ambro.	13 42	4	24	43	9	36	4	24	29	9 31
xiiii. 8.	5	D		13 46	5	25	42	9	58	5	25	28	9 52
7. ii.	6	E		13 50	6	26	40	10	19	6	26	26	10 14
x. 5.	7	F		13 53	7	27	38	10	40	7	27	24	10 35
	8	G		13 56	8	28	37	11	1	8	28	23	10 55
2. xviii.	9	A		13 59	9	29	35	11	22	9	29	21	11 16
	10	B		14 2	10	♉	34	11	43	10	♉	19	11 37
vii. 8.	11	C		14 5	11	1	32	12	3	11	1	18	11 57
	12	D		14 8	12	2	30	12	23	12	2	16	12 18
2. xv.	13	E		14 12	13	3	29	12	43	13	3	14	12 38
iiii. 8.	14	F		14 16	14	4	27	13	2	14	4	13	12 57
	15	G		14 20	15	5	25	13	21	15	5	11	13 17
9. xii.	16	A		14 24	16	6	23	13	41	16	6	9	13 36
i. 9.	17	B		14 28	17	7	21	14	0	17	7	7	13 55
	18	C		14 32	18	8	91	14	19	18	8	5	14 15
ix. 2.	19	D		14 36	19	9	17	14	37	19	9	3	14 33
	20	E		14 40	20	10	15	14	56	20	10	1	14 51
2. xvii.	21	F		14 44	21	11	13	15	14	21	10	59	15 10
vi.	22	G		14 47	22	12	12	15	32	22	11	57	15 27
xiiii. 8.	23	A	S. Geo.	14 50	23	13	10	15	50	23	12	56	15 46
	24	B	Faſt.	14 53	24	14	7	16	7	24	13	54	16 3
7. iii.	25	C	S. Mark	14 56	25	15	5	16	25	25	14	51	16 20
xi. 2.	26	D		14 59	26	16	3	16	41	26	15	49	16 37
	27	E		15 2	27	17	1	16	57	27	16	47	16 53
7. xix.	28	F		15 5	28	17	59	17	14	28	17	45	17 10
	29	G		15 8	29	18	57	17	30	29	18	43	17 26
	30	A		15 12	30	19	55	17	46	30	19	41	17 41
viii. 2.													

North Declination.

Of the Sunne.

	☉ in ♈ second yere			☉ in ♈ third yere		
	D.	M.	D.	M.	D.	M.
1	21	18	8	19	21	3	8	14
2	22	17	8	41	22	2	8	35
3	23	15	9	3	23	0	8	58
4	24	14	9	25	23	59	9	20
5	25	12	9	46	24	57	9	42
6	26	11	10	8	25	56	10	3
7	27	9	10	30	26	54	10	24
8	28	8	10	50	27	53	10	45
9	29	6	11	11	28	51	11	6
10	♉	4	11	32	29	49	11	27
11	1	3	11	52	♉	48	11	47
12	2	1	12	12	1	46	12	7
13	2	59	12	33	2	44	12	28
14	3	58	12	53	3	43	12	47
15	4	56	13	12	4	41	13	7
16	5	54	13	32	5	39	13	26
17	6	52	13	50	6	37	13	46
18	7	50	14	10	7	35	14	5
19	8	48	14	29	8	33	14	23
20	9	46	14	46	9	31	14	42
21	10	44	15	5	10	29	15	0
22	11	42	15	23	11	27	15	19
23	12	41	15	41	12	26	15	36
24	13	39	15	59	13	24	15	34
25	14	36	16	16	14	21	16	11
26	15	34	16	33	15	19	16	28
27	16	32	16	49	16	17	16	45
28	17	30	17	5	17	15	17	1
29	18	28	17	22	18	13	17	18
30	19	26	17	38	19	12	17	34

North Declination

15

Lyons backe is a ſtarre of the ſecond bignes, whoſe declination is 22. degrées 43. minutes northward, and his right aſcention is 10. houres 52 minutes.

16

Lyons tayle of the firſt bignes declination 16 degrées 50 minutes north, right aſcention 11 houres 29 minutes.

17

Ravens wing of ♍ third bignes, declination 15 degrées 16 minutes ſouth, right aſcention 11 houres 56 minutes.

18

Virgins ſpike of the firſt bignes, declination 9. degrées ſouth, right aſcention 13 houres 5 minutes.

May hath 31. dayes.

The Prime			Fast.	Leng. of the day.	Declination and true place ☉ in ♂ Leapeyeare			☉ in ♂ First yere		
				H.M.	D. M.	D, M,		D.M.	D.M.	
11. viii.	1	B	Phil. &	15 16	1 20 54	18 2		1 20 39	7 57	
6. xvi.	2	C	Iacob.	15 20	2 21 52	18 17		2 21 37	18 13	
v. 9.	3	D	Inuenti.	15 23	3 22 49	18 31		3 22 35	18 28	
	4	E	crosse.	15 26	4 23 46	18 46		4 23 33	18 42	
8. xiii. ii. 4	5	F		15 29	5 24 44	19 0		5 24 30	18 56	
	6	G	Io. Por.	15 32	6 25 43	19 14		6 25 28	19 11	
4. x.	7	A	Latin.	15 35	7 26 39	19 27		7 26 26	19 24	
	8	B		15 38	8 27 38	19 41		8 27 23	19 38	
xviii. 9.	9	C		15 40	9 28 34	19 54		9 28 21	19 51	
	10	D		15 42	10 29 33	20 6		10 29 18	20 3	
3. vii.	11	E		15 44	11 ♊ 29	20 18		11 ♊ 16	20 15	
xv. 8.	12	F		15 46	12 1 28	20 31		12 1 13	20 28	
	13	G		15 48	13 2 25	20 42		13 2 11	20 39	
8. iiii.	14	A		15 50	14 3 23	20 53		14 3 9	20 51	
xii.	15	B		15 53	15 4 21	21 4		15 4 6	21 1	
	16	C		15 56	16 5 18	21 14		16 5 4	21 12	
i.	17	D		15 58	17 6 15	21 25		17 6 1	21 22	
	18	E		16 0	18 7 13	21 34		18 6 59	21 32	
6. ix:	19	F	Dunst.	16 3	19 8 9	21 44		19 7 56	21 41	
xvii. 11.	20	G		16 6	20 9 8	21 52		20 8 53	21 50	
vi. 8.	21	A		16 9	21 10 4	22 1		21 9 51	21 59	
	22	B		16 12	22 11 2	22 9		22 10 48	22 7	
8. xiiii.	23	C		16 14	23 11 59	22 17		23 11 45	22 15	
iii. 1.	24	D		16 16	24 12 56	22 25		24 12 43	22 22	
	25	E		16 18	25 13 54	22 31		25 13 40	22 29	
10. xi.	26	F	August.	16 20	26 14 52	22 38		26 14 37	22 36	
xix. 6.	27	G		16 22	27 15 48	22 45		27 15 35	22 42	
	28	A		16 24	28 16 45	22 50		28 16 32	22 49	
	29	B		16 26	29 17 43	22 55		29 17 29	22 55	
8. viii.	30	C		16 27	30 18 39	23 0		30 18 26	22 59	
xvi. 6.	31	D		16 28	31 19 38	23 5		31 19 24	23 5	

North Declination

of the Sunne.

☉ in ye second yere			☉ in ye third yere.		
	D. M.	D. M.		D. M.	D. M.
1	20 25	17 54	1	20 10	17 50
2	21 23	18 9	2	21 8	18 5
3	22 21	18 25	3	22 6	18 21
4	23 19	18 39	4	23 4	18 35
5	24 16	18 53	5	24 1	18 49
6	25 14	19 7	6	24 59	19 4
7	26 12	19 21	7	25 57	19 18
8	27 9	19 34	8	26 54	19 31
9	28 7	9 47	9	27 52	19 44
10	29 4	20 0	10	28 49	19 57
11	0 II 2	20 12	11	29 47	20 9
12	0 59	20 25	12	II 44	20 22
13	1 57	20 37	13	1 42	20 34
14	2 55	20 48	14	2 40	20 45
15	3 52	20 59	15	3 37	20 56
16	4 50	21 10	16	4 35	21 7
17	5 47	21 20	17	5 32	21 17
18	6 45	21 30	18	6 30	21 27
19	7 42	21 39	19	7 27	21 37
20	8 39	21 48	20	8 24	21 46
21	9 37	21 56	21	9 22	21 54
22	10 34	22 5	22	10 19	22 3
23	11 31	22 13	23	11 16	22 11
24	12 29	22 21	24	12 14	22 19
25	13 26	22 28	25	13 11	22 26
26	14 23	22 35	26	14 8	22 33
27	15 21	22 41	27	15 6	22 40
28	16 18	22 48	28	16 3	22 46
29	17 15	22 53	29	17 0	22 52
30	18 12	22 58	30	17 57	22 57
31	19 9	23 4	31	18 55	23 3

North Declination.

19

Arcturus or betwixt boots thighes, is a starre of the first bignes, whose declination is 21 degrées 20 minutes north and his right ascention is 13. houres, 56. minutes.

20

South Balance of the second bignes, declination 14. degrées 14. minutes south, right ascention 14. houres 30. minutes.

21

North Balance of the second bignes, declination 7. degrées 46. minutes south, right ascention 14. houres 55 minutes.

22

Scorpions heart is a starre of the first bignes, whose declination is 25. degrées 25. minutes south, right ascention 16. houres 6. minutes.

June

Iune hath 30. dayes.

The Prime				Leng. of the day.	Declination and true place. ☉ in ix Leape yeare			☉ in ii First yere		
				H. M.	D. M.	D. M.		D. M.	D. M.	
	1	F		16 28	1 20 35	23 9		1 20 21	23 9	
8.y.	2	F		16 28	2 21 33	23 14		2 21 18	23 13	
1.xiii.	3	G		16 29	3 22 30	23 17		3 22 16	23 16	
7.ii.	4	A		16 29	4 23 28	23 20		4 23 13	23 20	
x.10.	5	B	Bonifa.	16 29	5 24 24	23 23		5 24 10	23 23	
	6	C		16 29	6 25 21	23 25		6 25 7	23 24	
xviii.6.	7	D		16 30	7 29 19	23 27		7 26 4	23 26	
	8	E		16 30	8 27 16	23 28		8 27 2	23 28	
vii.8.	9	F		16 30	9 28 13	23 29		9 27 59	23 29	
	10	G		16 30	10 29 10	23 30		10 28 56	23 30	
9.xv.	11	A	Barnab.	16 30	11 ♋ 7	23 30		11 29 53	23 30	
11.iiii.	12	B		16 30	12 1 5	23 30		12 ♋ 50	28 30	
xii.10	13	C		16 30	13 2 2	23 29		13 1 48	23 29	
	14	D		16 30	14 2 59	23 28		14 2 45	23 28	
	15	E		16 30	15 3 56	23 26		15 3 42	23 27	
9.i.	16	F		16 30	16 4 53	23 24		16 4 39	23 25	
ix.9.	17	G		16 29	17 5 51	23 22		17 5 36	23 23	
	18	A		16 29	18 6 48	23 19		18 6 34	23 20	
xvii.2.	19	B		16 28	19 7 45	23 16		19 7 31	23 17	
8.vi.	20	C	Edwar:	16 27	20 8 42	23 13		20 8 28	23 13	
xiiii.	21	D		16 26	21 9 39	23 8		21 9 25	23 10	
iii. 11.	22	E		16 25	22 10 36	23 4		22 10 22	23 6	
	23	F	Fast.	16 24	23 11 34	22 59		23 11 19	23 1	
xi.3.	24	G	IohnBa	16 23	24 12 31	22 54		24 12 17	22 55	
	25	A		16 22	25 13 28	22 49		25 13 14	22 51	
3.xix.	26	B		16 20	26 14 25	22 43		26 14 11	22 45	
	27	C		16 18	27 15 22	22 37		27 15 8	22 38	
viii.4.	28	D	Fast.	16 16	28 16 20	22 30		28 16 5	22 31	
.....	29	E	S.Peter.	16 14	29 17 17	22 23		29 17 3	22 25	
8.xvi.	30	F		16 13	30 18 14	22 15		30 18 0	22 17	

North Declination.

of the Sunne.

	☉ in ♊ second yere		☉ in ♊ third yeare.	
	D. M.	D. M.	D M	D. M.
1	20 7	23 8	19 52	23 6
2	21 4	23 12	20 49	23 11
3	22 2	23 15	21 47	23 14
4	22 59	23 19	22 44	23 18
5	23 56	23 22	23 41	23 22
6	24 53	23 24	24 38	23 23
7	25 50	23 26	25 35	23 25
8	26 48	23 28	26 33	23 27
9	27 45	23 29	27 30	23 29
10	28 42	23 30	28 27	23 30
11	29 39	23 30	29 24	23 30
12	♋ 36	53 30	♋ 21	23 30
13	1 34	23 30	1 19	23 30
14	2 31	23 29	2 16	23 29
15	3 28	23 28	3 13	23 28
16	4 25	23 26	4 10	23 26
17	5 22	23 24	5 7	23 24
18	6 20	23 21	6 5	23 22
19	7 17	23 18	7 2	23 19
20	8 14	23 14	7 59	23 15
21	9 11	13 11	8 56	23 12
22	10 8	23 6	9 53	23 7
23	11 5	23 3	10 50	23 3
24	12 3	22 57	11 48	22 58
25	13 0	22 52	12 45	22 53
26	13 57	22 46	13 42	22 48
27	14 54	22 40	14 39	22 42
28	15 51	22 34	15 36	22 35
29	16 49	22 27	16 34	22 28
30	17 46	22 19	17 31	22 21

North. Declination.

23

Hercules head is a starre of the third bignes, whose declination is 14 degrées 57 minutes north, and right ascention 16 houres 56 minutes.

24

Eagles heart is a starre of the second bignes, declination 17 degrées 54 min. north, right ascention 19. houres 32 minutes.

25

Dolphins tayle of the third bignes, declination 10 degrées north, right ascention 20 houres 16 minutes.

26

Goats tayle of the third bignes, declination 17 degrées 51 minutes south, right ascention 21 houres 27 minutes.

Iuly hath 31. dayes.

The Prime				Leng. of the day	Declination and true place ☉ in ♋ Leapyeare.					☉ in ♋ first yeare			
				H.M.	D.	M.	D.	M.		D.	M.	D.	M.
2. v.	1	G	Visitati.	16 12	1	19	11	22	8	1	18	57	22 9
xiii. 8.	2	A	Mary:	16 10	2	20	8	21	59	2	19	54	22 1
ii. 7.	3	B	Martin.	16 8	3	21	6	21	50	3	20	51	21 52
	4	C		16 6	4	22	3	21	41	4	21	49	21 44
x.	5	D		16 4	5	23	0	21	32	5	22	46	21 34
	6	E		16 1	9	23	57	21	22	6	23	43	21 25
4. xviii.	7	F		15 57	7	24	55	21	12	7	24	40	21 15
	8	G		15 54	8	25	52	21	1	8	25	38	21 4
9. vii.	9	A		15 51	9	26	49	20	51	9	26	35	20 54
xv.	10	B		15 48	10	27	47	20	39	10	27	32	20 43
iiii. 8.	11	C		15 46	11	28	44	20	28	11	28	30	20 31
	12	D		15 44	12	29	41	20	16	12	29	27	20 19
3. xii.	13	E		15 41	13	♌	39	20	3	13	♌	24	20 7
	14	F		15 38	14	1	36	19	51	14	1	22	19 54
i. 6.	15	G	Swithin	15 35	15	2	33	19	38	15	2	19	19 42
	16	A		15 32	16	3	31	19	25	16	3	16	19 28
2. ix.	17	B		15 29	17	4	28	19	11	17	4	14	19 15
xvii. 10	18	C		15 26	18	5	25	18	58	18	5	11	19 2
vi.	19	D	dog. d. b	15 23	19	6	23	18	43	19	6	8	18 47
xiiii. 8.	20	E	Margr.	15 20	20	7	20	18	29	20	7	6	18 32
	21	F		15 17	21	8	18	18	14	21	8	2	18 18
iii.	22	G	Magda.	15 13	22	9	15	17	59	22	9	1	18 3
	23	A		15 10	23	10	13	17	44	23	9	58	17 47
6. xi.	24	B	Fast,	15 7	24	11	10	17	29	24	10	56	17 32
xix. 11.	25	C	S. Iames	15 5	25	12	8	17	12	25	11	53	17 16
	26	D	Anna.	15 3	26	13	5	16	56	26	12	51	17 0
	27	E		15 0	27	14	3	16	39	27	13	48	16 43
9. viii.	28	F		14 59	28	15	0	16	23	28	14	46	16 27
xvi.	29	G		14 55	29	15	58	16	5	29	15	43	16 10
v. 7.	30	A		14 52	30	16	56	15	48	30	16	41	15 53
	31	B		14 50	31	17	53	15	30	31	17	39	15 34

North Declination.

July.

Outer Sphere.

	☉ in ♑ second yere		☉ in ♑ third yere	
	D. M	D. M.	D. M.	D. M.
1	18 43	22 11	18 28	22 13
2	19 40	22 3	19 25	22 5
3	20 37	21 55	20 22	21 56
4	21 35	21 46	21 20	21 48
5	22 32	21 37	22 17	21 39
6	23 29	21 27	23 13	21 29
7	24 26	21 18	24 11	21 20
8	25 24	21 7	25 9	21 9
9	26 21	20 56	26 6	20 59
10	27 18	20 46	27 3	20 48
11	28 16	20 34	28 1	20 37
12	29 13	20 23	28 58	20 25
13	♌ 10	20 10	29 55	20 13
14	1 8	19 57	♌ 53	20 0
15	2 5	19 45	1 50	19 48
16	3 2	19 32	2 47	19 35
17	4 0	19 18	3 45	19 21
18	4 57	19 4	4 42	19 8
19	5 54	18 50	5 39	18 53
20	6 52	18 36	6 37	18 39
21	7 49	18 22	7 35	18 25
22	8 47	18 6	8 32	18 10
23	9 44	17 51	9 29	17 55
24	10 42	17 36	10 27	17 40
25	11 39	17 20	11 24	17 25
26	12 37	17 4	12 22	17 8
27	13 34	16 47	13 19	16 52
28	14 32	16 31	14 17	16 35
29	15 29	16 15	15 14	16 19
30	16 27	15 57	16 12	16 2
31	17 25	15 40	17 10	15 44

North Declination.

27

Pegasus shoulder of the 2 bignes, declina. 12. deg. 58. min. North, right ascention 22. houres 46. minutes.

28

Pegasus Leg, of the third bignes, declination 25. deg. 58. minutes North, right ascention 22. houres 44. minutes.

29

Swans taile, is a starr of ỹ secobd bignes, whose declination is 43. degrées 54 minutes North: right ascention 20. houres 30. minutes.

30

The Wagoners right shoulder is a starre of the second bignes, declination 44. degrées 49. minutes north, and right ascention 5. hour. 30. minutes.

31

Hircus the Goate of the first bignes, declination 45. degrées 30. minutes, right ascention 4. houres 49. minutes.

32

Lira of the first bignesse, north Declination, 38. degrées 30. minutes, right ascention 18. houres 20. minutes.

August

The Prime				Leng. of the day.	☉ in S. Leap yeare		☉ in S. First yere.		
				H. M.	D. M.	D. M.		M. D.	M D
6. xiii.	1	C	Lámas.	14 46	1 18 51	15 13	1	18 36	15 17
2. ii.	2	D		14 42	2 19 48	14 54	2	19 34	14 59
	3	E		14 38	3 20 46	14 36	3	20 31	14 41
7. x.	4	F		14 34	4 21 44	14 18	4	21 29	14 23
xviii. 9.	5	G		14 30	5 22 42	13 59	5	22 27	14 4
	6	A		14 26	6 23 40	13 40	6	23 25	13 45
vii.	7	B		14 22	7 24 37	13 21	7	24 23	13 25
xv. 7.	8	C		14 18	8 25 35	13 1	8	25 20	13 6
	9	D		14 15	9 26 33	12 42	9	26 18	12 47
5. iiii.	10	E	Lauren.	14 12	10 27 31	12 23	10	27 16	12 28
xii. 11.	11	F		14 9	11 28 29	12 2	11	28 14	12 7
	12	G		14 6	12 29 27	11 42	12	29 12	11 47
	13	A		14 3	13 ♍ 25	11 21	13	♍ 10	11 27
3. i.	14	B		14 0	14 1 23	11 1	14	1 8	11 6
ix. 12.	15	C		13 56	15 2 21	10 39	15	2 6	10 45
	16	D		13 52	16 3 19	10 19	16	3 4	10 25
vi. 7. xvii	17	E		13 50	17 4 17	9 58	17	4 2	10 4
	18	F		13 44	18 5 15	9 36	18	5 0	9 42
9. xiiii.	19	G		13 40	19 6 13	9 14	19	5 58	9 20
	20	A		13 35	20 7 11	8 54	20	6 56	8 59
8. iii.	21	B		13 30	21 8 9	8 32	21	7 54	8 37
xi. 9.	22	C		13 25	22 9 8	8 10	22	8 52	8 16
	23	D	Fast.	13 20	23 10 6	7 48	23	9 51	7 53
xix. 4.	24	E	Barthol	13 15	24 11 4	7 26	24	10 49	7 32
	25	F	Apostle	13 10	25 12 2	7 4	25	11 47	7 9
viii.	26	G		13 6	26 13 1	6 42	26	12 45	6 47
xvi. 8.	27	A		13 2	27 13 59	6 19	27	13 44	6 25
	28	B		12 58	28 14 58	5 55	28	14 42	6 2
7. v.	29	C	Behead.	12 54	29 15 56	5 33	29	15 41	5 39
xiii. 5.	30	D	of Iohn	12 51	30 16 54	5 11	30	16 41	5 16
	31	E		12 48	31 17 52	4 48	31	17 40	4 52

North Declination.

August.

of the Sunne.

	☉ in ♌ second yere		☉ in ♌ third yeare.	
	D. M.	D. M.	D. M.	D. M.
1	18 22	15 22	18 7	15 26
2	19 20	15 4	19 5	15 8
3	20 17	14 46	20 2	14 50
4	21 15	14 27	21 0	14 32
5	22 13	14 9	21 58	14 13
6	23 11	13 49	22 56	13 54
7	24 9	13 30	23 54	13 35
8	25 6	13 11	24 51	13 16
9	26 4	12 52	25 49	12 57
10	27 2	12 32	26 47	12 37
11	28 0	12 12	27 45	12 17
12	28 58	11 52	28 43	11 57
13	29 56	11 31	29 41	11 36
14	♍ 54	11 11	♍ 39	11 16
15	1 52	10 49	1 37	10 55
16	2 50	10 29	2 35	10 35
17	3 48	10 8	3 33	10 14
18	4 46	9 47	4 31	9 53
19	5 44	9 26	5 29	9 31
20	6 42	9 4	6 27	9 10
21	7 40	8 42	7 25	8 49
22	8 38	8 21	8 23	8 27
23	9 37	7 59	9 22	8 5
24	10 35	7 37	10 20	7 43
25	11 33	7 15	11 18	7 21
26	12 31	6 53	12 16	6 59
27	13 30	6 30	13 15	6 36
28	14 28	6 7	14 13	6 14
29	15 26	5 45	15 12	5 51
30	16 25	5 22	16 10	5 28
31	17 23	5 0	17 8	5 6

North Declination

33

Perseus right side of the second bigneſſe, Declination 47. degr. north, right aſcention, 2, houres 56 minutes.

34

Fomahand is a ſtarre of the firſt bignes, having south Declination 33, degrées 15, minutes, and right aſcention 22, houres 40, minutes.

35

In the knée of Sagitarius is a ſtarre of the ſecond bignes having south Declination, 42, drg. and right aſcention 18 houres 44, minutes.

Starres neare about the north Pole, with their diſtance from the ſaid Pole.

1

The Pole ſtarre is of the third bignes, whoſe diſtance from ♄ Pole is 2. deg. 52, mi. & his right aſcen. is 50, min.

2

The foremoſt Guard of ♄ ſecond bignes, diſtant frō the Pole 14, deg. 11, min. right aſcention 14. hou. 54 minut.

2

The hindermoſt Guard, of the ſecond bignes, diſtant 16 degrées, 42, minutes right aſcention 15, hou. 26, min.

Septem-

September hath 30. days.

The Prime.				Length of the day.	☉ entring Libra's yere		☉ in my Pisces yere	
				H.M.	D.M.	D.M.	D.M.	D.M.
12. ii.	1	F	Giles.	12 48	1 18	51 4 25	1 18	56 4 30
x. 8.	2	G		12 44	2 19	49 4 2	2 19	35 4 8
	3	A		12 40	3 20	48 3 40	3 20	33 3 45
3. xviii.	4	B		12 36	4 21	46 3 16	4 21	32 3 22
vii. 7.	5	C	Dog da.	12 32	5 22	45 2 53	5 22	30 2 59
	6	D	end.	12 28	6 23	44 2 29	6 23	29 2 35
9. xv.	7	E	Nat. Eli.	12 24	7 24	42 2 7	7 24	28 2 12
iiii. 9.	8	F	Nat. Ma.	12 20	8 25	41 1 42	8 25	26 1 49
	9	G		12 16	9 26	40 1 20	9 26	25 1 25
xii. 2.	10	A		12 12	10 27	39 0 57	10 27	24 1 2
	11	B		12 8	11 28	38 0 33	11 28	23 0 39
i. 11.	12	C		12 4	12 29	36 0 9	12 29	22 0 15
	13	D		12 0	13 ♎	35 0 14	13 ♎	21 0 8
2. ix.	14	E	Hol. cr.	11 56	14 1	34 0 38	14 1	19 0 32
xvii. 8.	15	F		11 52	15 2	33 1 1	15 2	18 0 55
8. vi.	16	G		11 48	16 3	32 1 25	16 3	17 1 19
xiiii. 2.	17	A	Lamb.	11 44	17 4	31 1 47	17 4	16 1 42
	18	B		11 40	18 5	30 2 12	18 5	15 2 6
iii. 7.	19	C		11 36	19 6	30 2 35	19 6	14 2 29
	20	D	Fast.	11 32	20 7	29 2 59	20 7	13 2 52
xi. 2.	21	E	Mathe.	11 28	21 8	28 3 22	21 8	13 3 16
	22	F		11 24	22 9	27 3 45	22 9	12 3 40
5. xix.	23	G		11 20	23 10	26 4 8	23 10	11 4 2
viii. 9.	24	A		11 16	24 11	26 4 32	24 11	10 4 26
	25	B	Cypriã.	11 12	25 12	25 4 55	25 12	10 4 49
8. xvi.	26	C		11 8	26 13	24 5 18	26 13	9 5 13
v. 5.	27	D		11 4	27 14	24 5 41	27 14	8 5 35
	28	E	Fast.	11 0	28 15	23 6 4	28 15	8 5 58
4. xiii.	29	F	S. Mich.	10 56	29 16	23 6 27	29 16	7 6 22
ii. 6.	30	G	Hie. om	10 52	30 17	22 6 50	30 17	7 6 45

North Declination.

South Declination.

September.

of the Sunne

☉ in ye second yere				☉ ye third yere.			
	D.	M.	D. M.		D.	M.	D. M.
1	18	21	4 37	1	18	6	4 43
2	19	20	4 14	2	19	5	4 20
3	20	18	3 51	3	20	3	3 57
4	21	17	3 28	4	21	2	3 34
5	22	15	3 5	5	22	0	3 11
6	23	14	2 42	6	22	59	2 47
7	24	13	2 18	7	23	58	2 23
8	25	11	1 56	8	24	56	2 1
9	26	10	1 31	9	25	55	1 37
10	27	9	1 9	10	26	54	1 14
11	28	8	0 45	11	27	53	0 51
12	29	7	0 21	12	28	52	0 27
13	♍	6	0 2	13	29	51	0 4
14	1	4	0 26	14	♎	49	0 19
15	2	3	0 49	15	1	48	0 43
16	3	2	1 12	16	2	47	1 7
17	4	1	1 35	17	3	46	1 30
18	5	0	2 0	18	4	45	1 53
19	5	59	2 23	19	5	44	2 17
20	6	59	2 47	20	6	44	2 40
21	7	58	3 11	21	7	43	3 3
22	8	57	3 34	22	8	42	3 27
23	9	56	3 56	23	9	41	3 51
24	10	55	4 20	24	10	40	4 13
25	11	55	4 43	25	11	40	4 37
26	12	54	5 7	26	12	39	5 0
27	13	53	5 29	27	13	38	5 23
28	14	53	5 52	28	14	38	5 46
29	15	52	6 15	29	15	37	6 9
30	16	52	6 39	30	16	37	6 33

North Declination.

South Declination.

4

The end of the Dragons taile of the third bignes, distant from the Pole 18 deg. 26 minutes, right ascention 11. houres 8. minutes.

5

The great Beares backe of the second bignes, distant from the Pole 26 degr. 5. minutes, right ascent. 10. houres 40 minutes.

6

Cepheus right shoulder of the third bignes, distant 29. deg. right ascention 21. houre 10. min.

7

The great Beares side of the second bignes, distant 31. deg. 26 min. right ascention 10 houres 58 min.

8

The first in her taile of ye second bignes, distant 31. deg. 49 min. right ascention 12 houres 32 minutes.

October hath 31. dayes.

The Prime.				Leng. of the day.	Declination and true place ☉ in the Leapeyere				☉ in the First yere			
				H.M.	D.	M.	D.	M.	M.	D.	M.	D.
	1	A		10 48	1	18	22	7 13	1	18	6	7 7
2. x.	2	B		10 44	2	19	21	7 36	2	19	6	7 30
xviii. 10	3	C		10 40	3	20	21	7 58	3	20	5	7 52
	4	D		10 36	4	21	20	8 20	4	21	5	8 15
8. vii.	5	E		10 32	5	22	20	8 42	5	22	5	8 37
xv.	6	F	Faith.	10 28	6	23	20	9 5	6	23	4	8 59
	7	G		10 24	7	24	20	9 27	7	24	4	9 21
iiii. I.	8	A		10 20	8	25	19	9 49	8	25	4	9 43
	9	B	Dennis.	10 16	9	26	19	10 11	9	26	4	10 5
4. xii.	10	C		10 12	10	27	19	10 33	10	27	3	10 27
	11	D		10 8	11	28	19	10 54	11	28	3	10 48
i.	12	E		10 4	12	29	19	11 16	12	29	3	11 10
ix. 10.	13	F	Edward	10 0	13	m	19	11 36	13	m	3	11 31
xvii. 17	14	G		9 56	14	1	19	11 57	14	1	3	11 52
vi. 3.	15	A		9 52	15	2	19	12 18	15	2	3	12 13
	16	B		9 48	16	3	19	12 39	16	3	3	12 34
8. xiiii.	17	C	Fast.	9 44	17	4	19	12 59	17	4	3	12 54
	18	D	S. Luke.	9 40	18	5	19	13 19	18	5	3	13 14
iii.	19	E		9 36	19	6	20	13 39	19	6	3	13 34
	20	F		9 32	20	7	20	14 0	20	7	4	13 54
6. xi.	21	G		9 28	21	8	20	14 20	21	8	4	14 14
xix. 8	22	A		9 24	22	9	20	14 39	22	9	4	14 33
	23	B		9 20	23	10	20	14 58	23	10	4	14 52
7. viii.	24	C		9 17	24	11	21	15 17	24	11	4	15 11
xvi. 2.	25	D	Crispin.	9 14	25	12	21	15 35	25	12	5	15 39
	26	E		9 10	26	13	21	15 52	26	13	5	15 48
4. v.	27	F	Fast.	9 7	27	14	21	16 12	27	14	5	16 6
	28	G	Simon	9 4	28	15	22	16 30	28	15	6	16 25
II. xiii.	29	A	& Iude.	9 0	29	16	22	16 46	29	16	6	16 49
2. ii.	30	B		8 56	30	17	23	17 4	30	17	7	16 55
x. II.	31	C		8 52	31	18	23	17 21	31	18	7	17 16

South Declinacion.

Of the Sunne.

	☉ in ♎ second yere			☉ in ♎ third yeare		
	D.	M.	South Declination.	D.	M.	
1	17	51	7 2	17	36	6 56
2	18	51	7 25	18	36	7 19
3	19	50	7 47	19	35	7 41
4	20	50	8 9	20	35	8 3
5	21	50	8 32	21	35	8 26
6	22	49	8 53	22	34	8 48
7	23	49	9 16	23	34	9 10
8	24	49	9 38	24	34	9 32
9	25	49	10 0	25	34	9 54
10	26	48	10 22	26	33	10 16
11	27	48	10 43	27	33	10 38
12	28	48	11 4	28	33	10 59
13	29	48	11 26	29	33	11 20
14	m	48	11 47	m	33	11 41
15	1	48	12 8	1	33	12 2
16	2	48	12 29	2	33	12 23
17	3	48	12 50	3	33	12 44
18	4	48	13 10	4	33	13 4
19	5	48	13 30	5	33	13 24
20	6	49	13 50	6	33	13 44
21	7	49	14 10	7	34	14 4
22	8	49	14 29	8	34	14 24
23	9	49	14 48	9	34	14 44
24	10	49	15 6	10	34	15 2
25	11	49	15 25	11	35	15 20
26	12	50	15 43	12	35	15 38
27	13	50	16 2	13	35	15 57
28	14	51	16 20	14	36	16 15
29	15	51	16 38	15	36	16 33
30	16	52	16 55	16	37	16 50
31	17	52	17 12	17	37	17 7

9

At the knees of Cassiopeia, is a starre of the third bignes, distant from the Pole 31. degrées 50. min. right ascention 1. houre.

10

In her lippe is a starre of the third bignes, distant 31. degrées 26. minutes, right ascention 32 minutes.

11

The backe of her chaire of the third bignes, distant 33. degrées 2. minutes right ascention 23 houres 48. minutes.

12

The great Beares thigh of the second bignes, distant from the Pole, 34. degrees 3 minutes right ascention 11. houres 32 minutes.

Nouember hath 30. daies.

The Prime.				Leng of the day.	Declination and true place. ☉ in π Leape yeare			☉ in π First yeare		
				H.M.	D.M.	D.M.		D.M.	D.M.	
	1	D	All Sain	8 49	1 19 22	17 37		1 19 7	17 33	
5. xviii.	2	E		8 46	2 20 23	17 53		2 20 7	17 49	
vii. 3.	3	F		8 43	3 21 23	18 9		3 21 8	18 5	
	4	G		8 40	4 22 24	18 25		4 22 8	18 21	
II. xv.	5	A	K. pref.	8 37	5 23 25	18 40		5 23 9	18 36	
	6	B	Leonar.	8 34	6 24 25	18 55		6 24 10	18 51	
5. iiii.	7	C		8 31	7 25 26	19 10		7 25 10	19 6	
	8	D		8 29	8 26 27	19 24		8 26 11	19 20	
II. xii.	9	E		8 25	9 27 27	19 38		9 27 12	19 35	
i. 12.	10	F		8 22	10 28 28	19 52		10 28 12	19 49	
	11	G	S. Mart.	8 19	11 29 29	20 5		11 29 13	20 2	
2. ix.	12	A		8 16	12 ♑ 30	20 18	South Decl.	12 ♑ 14	20 15	
xvii. 4.	13	B		8 13	13 1 31	20 31		13 1 15	20 28	
8. vi.	14	C		8 10	14 2 32	20 43		14 2 16	20 40	
xiiii. 8.	15	D		8 7	15 3 33	20 55		15 3 17	20 52	
	16	E		8 4	16 4 33	21 6		16 4 17	21 3	
	17	F		8 2	17 5 34	21 17		17 5 18	21 14	
5. iii.	18	G		8 0	8 6 35	21 28		18 6 19	21 25	
xi. 9.	19	A		7 57	19 7 36	21 38		19 7 20	21 35	
	20	B	Edmon	7 54	20 8 37	21 48		20 8 21	21 45	
4. xix.	21	C		7 51	21 9 38	21 57		21 9 22	21 54	
viii. 5.	22	D	Cicily.	7 49	22 10 39	22 6		22 10 23	22 3	
	23	E	Clemen	7 47	23 11 40	22 14		23 11 24	22 12	
II. xvi.	24	F		7 45	24 12 41	22 22		24 12 25	22 20	
	25	G	Kather.	7 43	25 13 42	22 30		25 13 26	22 28	
10. v.	26	A		7 40	26 14 44	22 37		26 14 27	22 35	
xiii. 8.	27	B		7 38	27 15 45	22 44		27 15 29	22 42	
	28	C		7 37	28 16 46	22 51		28 16 30	22 49	
ii. 12.	29	D	Fast	7 36	29 17 47	22 57		29 17 31	22 55	
2. x.	30	E	Andre.	7 35	30 18 47	23 2		30 18 32	23 0	

November.

of the sunne,

☉ in m second yere.				☉ in m third yere.			
	D.	M.	D. M.		D.	M.	D. M.
1	18	52	17 29	1	18	37	17 24
2	19	52	17 45	2	19	37	17 41
3	20	53	18 1	3	20	38	17 57
4	21	53	18 17	4	21	38	18 13
5	22	54	18 33	5	22	39	18 29
6	23	54	18 47	6	23	39	18 44
7	24	55	19 2	7	24	40	18 59
8	25	56	19 17	8	25	41	19 14
9	26	57	19 31	9	26	42	19 28
10	27	57	19 45	10	27	42	19 42
11	28	57	19 59	11	28	43	19 56
12	29	59	20 13	12	29	44	20 9
13	17	0	20 25	13	07	45	20 22
14	2	1	20 37	14	1	46	20 34
25	3	2	20 49	15	2	47	20 46
16	4	3	21 0	16	3	48	20 58
17	5	3	21 11	17	4	48	21 9
18	6	4	21 22	18	5	49	21 20
19	7	5	21 33	19	6	50	21 30
20	8	6	21 43	20	7	51	21 40
21	9	7	21 52	21	8	52	21 50
22	10	8	22 1	22	9	53	21 59
23	11	9	22 10	23	10	54	22 8
24	12	10	22 18	24	11	55	22 17
25	13	11	22 26	25	12	56	22 25
26	14	12	22 33	26	13	57	22 32
27	15	14	22 40	27	14	59	22 39
28	16	15	22 47	28	16	0	22 46
29	17	16	22 53	29	17	1	22 52
30	18	17	22 58	30	18	2	22 57

South Declination.

Certaine Starres neere vnto the South Pole, with their distance from the said Pole, and right ascention.

1

The southermost starre in the south triangle, is a starre of the third bignes, distant from the south Pole, 11, degrées 30, minutes right ascention 9, houres.

2

The southermost of the Crosiers, is a Starre of the second bignes, distant [illegible] degrées 40, minutes right ascention 12, minutes. 28 - 40

3

In the Northwest angle of the south triangle, is a Starre of the second bignes, distant from the Pole, 27. degrées 25 minutes right ascention 8, houres 4, minutes.

December hath 31. dayes.

The Prime				Leng. of the day.	Declination and true place. ☉ in ♄ Leapyeare.				☉ in ♄ First yeare			
				H.M.	D.M.		D M.			D.M.		D.M.
xviii. 5	1	F		7 34	1	19 48	23 6		1	19 33	23 5	
	2	G		7 33	2	20 49	23 10		2	20 34	23 9	
9. vii.	3	A		7 32	3	21 51	23 15		3	21 35	23 14	
xv. 4	4	B		7 31	4	22 52	23 19		4	22 37	23 17	
	5	C		7 30	5	23 53	23 22		5	23 38	23 21	
	6	D		7 30	6	24 54	23 24		6	24 39	23 23	
10. iiii.	7	E		7 30	7	25 55	23 26		7	25 40	23 25	
xii 7.	8	F	Con. M	7 30	8	26 57	23 28		8	26 41	23 27	
	9	G		7 30	9	27 58	23 29		9	27 43	23 29	
2. i.	10	A		7 30	10	28 59	23 30		10	28 44	23 30	
ix. 7	11	B		7 30	11	♍ 0	23 30		11	29 45	23 30	
xvii. 15	12	C		7 30	12	1 1	23 30		12	♍ 46	22 30	
vi. 9.	13	D	Luci.	7 30	13	2 2	23 29		13	1 47	23 29	
	14	E		7 31	14	3 4	23 28		14	2 49	23 28	
xiiii. 3.	15	F		7 32	15	4 5	23 26		15	3 50	23 26	
	16	G		7 33	16	5 6	23 24		16	4 51	23 24	
iii. 11.	17	A		7 34	17	6 7	23 22		17	5 52	23 22	
	18	B		7 35	18	7 8	23 19		18	6 54	23 19	
xi.	19	C		7 36	19	8 10	23 15		19	7 55	23 15	
xix. 8.	20	D	Fast	7 37	20	9 11	23 11		20	8 56	23 11	
9. viii.	21	E	S. Tho.	7 38	21	10 13	23 6		21	9 57	23 7	
	22	F		7 39	22	11 14	23 2		22	10 58	23 2	
xvi. 3.	23	G		7 40	23	12 15	22 56		23	11 59	22 57	
	24	A		7 41	24	13 16	22 50		24	13 1	22 52	
v. 10.	25	B	Christ.	7 42	25	14 18	22 44		25	14 2	22 46	
	26	C	S. Step.	7 43	26	15 20	22 37		26	15 4	22 39	
xiii. 3.	27	D	S. Iohn	7 44	27	16 20	22 30		27	16 5	22 32	
ii. 1.	28	E	Innoce.	7 46	28	17 21	22 23		28	17 6	22 24	
x. 9.	29	F		7 48	29	18 22	22 14		29	18 7	22 16	
	30	G		7 49	30	19 24	22 6		30	19 8	22 8	
7. xviii.	31	A		7 50	31	20 25	21 57		31	20 10	21 59	

South Declination.

December

of the Sunne.

⊙ in ♐ second yere				⊙ in ♐ third yeare.			
	D.	M.	D. M.		D.	M.	D. M.
1	19	18	23 4	1	19	2	23 3
2	20	19	23 8	2	20	3	23 7
3	21	20	23 13	3	21	4	23 12
4	22	21	23 16	4	22	6	23 15
5	23	22	23 20	5	23	7	23 19
9	24	23	23 23	6	24	8	23 22
7	25	24	23 25	7	25	9	23 24
8	26	26	23 27	8	26	10	23 26
9	27	27	23 29	9	27	12	23 28
10	28	29	23 30	0	28	13	23 29
11	29	30	23 30	11	29	14	23 30
12	♍	31	23 30	12	♍	15	23 30
13	1	32	23 30	13	1	16	23 30
14	2	34	23 29	14	2	18	23 29
15	3	35	23 27	15	3	19	23 28
16	4	36	23 25	16	4	20	23 26
17	5	37	23 23	17	5	21	23 24
18	6	39	23 20	18	6	23	23 21
19	7	40	23 17	19	7	24	23 18
20	8	41	23 13	20	8	25	23 14
21	9	42	23 9	21	9	26	23 10
22	10	44	23 4	22	10	28	23 5
23	11	45	22 59	23	11	29	23 0
24	12	46	22 53	24	12	30	22 54
25	13	47	22 48	25	13	31	22 49
26	14	49	22 41	26	14	33	22 43
27	15	50	22 33	27	15	34	22 35
28	16	51	22 26	28	16	35	22 28
29	17	52	22 19	29	17	36	22 21
30	18	53	22 10	30	18	37	22 12
31	19	55	22 1	31	19	39	22 4

South Declination.

The foreſoote of the Centaur of the ſecond bignes, diſtant 29. degrées 54. minutes right aſcention 14. houres 44. minutes.

5

Centaurs thigh of the ſecond bignes, diſtant 40. degrées 30. minutes, right aſcention 11. houres 52. minutes.

6

Canopus in argo nauis of the firſt bignes, diſt. from the ſouth Pole 38. degrées 10. minutes, right aſcention 6. houres 60. minutes.

7

The laſt of Eridanus of the firſt bignes, diſtant 50. degrées right aſcention 3. houres.

How to vſe theſe Starres, for the time of their being vpon the Meridian, and conſequently to finde the height of the Pole or latitude by them, followes afterward.

This Table

	♈ / ♎		♉ / ♏		♊ / ♐		
	D.	M.	D.	M.	D.	M.	
0	0	0	11	30	20	12	30
1	0	24	11	51	20	25	29
2	0	48	12	12	20	37	28
3	1	12	12	33	20	49	27
4	1	35	12	53	21	0	26
5	2	0	13	13	21	11	25
6	2	23	13	33	21	22	24
7	2	47	13	53	21	33	23
8	3	11	14	13	21	42	22
9	3	35	14	32	21	51	21
10	3	58	14	51	22	0	20
11	4	22	15	10	22	9	19
12	4	45	15	28	22	17	18
13	5	9	15	47	22	25	17
14	5	32	16	5	22	32	16
15	5	55	16	23	22	39	15
16	6	19	16	40	22	46	14
17	6	42	16	57	22	52	13
18	7	5	17	14	22	57	12
19	7	28	17	31	23	3	11
20	7	50	17	47	23	7	10
21	8	13	18	3	23	12	9
22	8	35	18	19	23	15	8
23	8	58	18	34	23	19	7
24	9	20	18	49	23	22	6
25	9	42	19	4	23	24	5
26	10	4	19	18	23	26	4
27	10	26	19	32	23	28	3
28	10	47	19	46	23	29	2
29	11	9	19	59	23	30	1
30	11	30	20	12	23	30	0
	♍ / ♓		♌ / ♒		♋ / ♑		

This Table sheweth the Declination of the Sunne vpon euery seuerall degrée of ỹ Ecliptick through all the foure quarters of the Zodiacke: by which Table you may make triall of the former Table of Declination, if you doubt of any part thereof, as followeth.

First by the Kalender or Ephemerides next before, finde out the day of the month, for which you desire the Declination, & right against the same you shall haue the signe, degrée & minute, which the Sun possesseth in the Zodiacke the day aforesaid, with which signe and degrée, enter this Table and marke whether your signe be at the head of the Table, or at the foote thereof: for if the signe be at the head, then you must count the degrés thereof downeward, in the first Columne at the left hand of the Table: but if the signe be at the foots of the Table, you must count the degrée thereof vpward, in the first Colume on the right hand: and in the common angle, where the Characters of the signe and deg. thereof méetes, is the degrée and minutes of declination desired.

Example.

The 5. of July 1616. the place of the Sunne is 23 deg. of Can. I finde Cán. in the foote of the Table, therefore counting 23. degrées thereof vpward

vpward in the first Columne on the right hande, right against 23. in the columne where Canc. stands. is 21. degrées 33. min. which is the declination of 23. degrées of Canc. or of the Sunne, being in so many degrées of the same signe. But if the place of the sunne have odde minutes therwith, you must take ỹ difference betwixt the 2 neerest degrées of declination, and worke by the proportionall partes of 60. minutes to a degrée, as for example. The 22. of August 1617. the true place of the Sun is 8. degr. 52. minutes of Virgo, I finde Virgo to be in the foote of the Table, therfore in the first columne on the right hand, I count vpwardes 8. degrées and right against the same in the columne where the charact. of Virgo is, I finde 8. degrées 35. minutes which is the Declination of 8. degrées of Virgo, but now there is the Declination of 52. minutes to be either added or deducted, as the Declination doth increase or decrease. To finde which, I take the difference betwixt 8. degrées, 35. minutes, the Declination of 8. degrées of Virgo and 8. 13. minutes, the declination of 9. degrées of Virgo, which is 22. minutes. Then I say, if 60 minu. giue 22. minutes, what gines 52, min. facit, 19. min. 4. seconds: but omitting the seconds, because the declination doth decrease, I deduct 19. min. from 8. 35. min. and the remainer is 8. 16. minutes for the true declination of 8. degrées 52. minutes of Virgo.

Againe, the 16. of Aprill, 1618. the true place of the Sun is 5 degrées 54. minutes of Taurus, I finde Taurus in the head of the Table, then counting 5. degrées downeward in the first columne on the left hand, right against the same vnder Taurus is 13. 13. min. for the declination of 5. degrées of Taurus then for the 54. min. I take the difference betwixt 13. 13. minutes, and 13. 33. min. the declination of 6. deg. of Taurus: which is 20. min. then I say if 60. giue 20. what gines 54. facit 18. min. which 18. min. I adde to 13. 13. minutes, because the Declination doth increase and it makes 13. 31. minutes for the true Declination of 5. 54. minuts of Taurus. These three examples (to the ingenious) are as good as fiue hundreth.

The diuiſion, partes, order, and explanation of the former Almanacke or Ephemerides.

The firſt Page of the ſaid Ephemerides containes an Almanacke for 24. yeares to come, ſhewing the Prime, Epacts, Sunday letter, Leap yeare, with all the principall moueable Feaſtes in the whole yeare. Next followes the 12. monthes of the yeare in order, each month containing two faces, which 2. faces may be deuided into 3. principall ſections: the firſt common, the ſecond and third Aſtronomicall: the firſt being indeed the common, becauſe it is moſt needfull for all perſons, conſiſteth of fiue Columnes or ſpaces: the firſt ſpace whereof ſheweth the day and houres of the Moones change for 19 yeares to come: the ſecond ſheweth the number of the dates in euerie month: the third, the Letters ordinary for euery day of the yeare: the fourth, the holy-dates and other dates of note in each month. Where note, that thoſe that are obſerued for holy dates, haue this word Faſt, before them, and the firſt or laſt of the ſaid firſt ſection, ſheweth the length of the day in houres and minutes where the Pole is eleuated 51. degrées 40 minutes.

The ſecond ſection containeth 4. principal parts, each parte conſiſting of 3. Columnes, the 4. partes being 4. ſeuerall yeares, each fourth yeare being Leape yeare, therin compriſing the variety of the Suns Courſe through the Zodiacke in the ſaid 4. yeares. And the 3. ſpaces or Columnes in each yere, the firſt is the dates of each month in the ſaid yeare, the ſecond the true place of the Sun anſwerable thereto, the third, the Declination or diſtance of the Sunne from the Equinoctiall pointes of Aries and Libra, toward the tropicall points of Cancer and Capricorne anſwerable to each day of the month, and to the degrée and minutes of the Sunne in the Zodiacke.

The reason wherefore the said Table is made for 4. yeares and neither more nor lesse, is because that every yeare is not of like equalitie of daies one with another: for ♄ first yeare hath 365 daies and neere 6. houres: the second and third yeares being so likewise, but in the fourth yeare, the odde houres are united together, which being 4. times 6. is 24 houres veris neare, making a naturall day, which day is added to the saide fourth yeare, wherby the said fourth yeare is called leape yeare, because it hath one day more then his fellowes.

And so This table being made for 4. yeares, would serue for a long time, were it not that the saide fourth yeare is not iust 366 daies, but wants 20. min. or the $\frac{1}{3}$ of an houre, for if there were a iust equalitie made of the daies of the yeares, with the progresse of the sunne through the Zodiacke, then this table would serue for a long time without correction: but only the Zodiacke, with the whole eyght sphеare hath a certaine retrograde motion or going backward, yet so insensible, that these Tables being gathered and calculated out of the best and truest Ephemerides for the yeres 1617. 1618. 1619. 1620. according to the true place and dayly motion of the sunne there exactly gathered, I make no question, but that they will very well serue for 20. yeares at the least, the difference of the Suns place every 5. yeare is so small, being not much above 30. seconds or halfe a minute, which in 20. yeares being 5. Bissextels or leaps yeares, makes 2. minutes 30. seconds: a small matter to make any difference in the Suns declination.

Notwithstanding which small error that can growe in so long a time, I thinke it not amisse for the satisfying of those ingenious spirits, which desire perfection in their worke, to adde this one rule for their further satisfaction, that after these 4. yeares are past, for which the said former Tables are exactly and truly calculated, to know precisely the true place of the Sunne, for any other 4. yeares afterward, doe thus: subtract 1616. from the date of the yeare in which you would knowe the true place of the Sunne, the remainer wherof deuided by 4. that which remaines upon the said deuision, sheweth which of the 4. yeares in the former Kalender serueth to shewe the Sunnes place for the

yeare

yeare proposed, and if nothing remaine after the Diuision, then the last of the yeres being the fourth in number, is your yeare desired: which knowne, to make an equation of the Sunnes true place, marke how many Vnities are in your quotient, for so many min. must be added to the Suns place in the said yere formerly found for euery day in the monthes of May, June, July, August, September, and October, and halfe of so many minutes in the other monthes.

As for Example.

I would knowe the true place of the Sunne the 15. of August. in the yeare 1624. first I subtract 1616. from 1624. and there resles 8. which deuided by 4. bringes 2. in the quotient, and 0. remaines, which 0. shewes that the first of the 4. yeares, answeres to the yeare desired, and being that there is 2. in the quotient, therfore I must adde 2. minutes to the place of the Sunne, which is belonging to the day and yeare aforesaide, which being that to the 15. of August in the first of the yeares, belongs 2. degrees 21. minutes of Virgo, I adde two minutes thereto, and the whole 2. 23 minutes is the true place of the Sunne for the day and yeare aforesaid, whose declination answerable thereto, you shall finde right against the same in the next columne towards the right hand to be 10 degrees 39. minutes.

Againe, the 15. of March in the yeare 1625. I desire the true place of the Sun, therfore subtracting 1616. from 1625. rests 9. which deuided by 4. the quotient is 2. and the remainer is 1. which remainer being 1. I must seeke for the Sunnes place in the second of the 4. yeares, whose place there I finde for the 15. of March, to be 4. degrees 51. minutes of Aries: to which, because the quotient is 2. I adde halfe so many minutes, which being 1. minute, makes 4. degrees 52. minutes, for the Sunnes true place the 15. of March 1625. whose declination answerable thereto, you shall finde right against the same in the next columne towards the right hand, to be 1. degree 57. minutes northerly: Wherin thus much is to be noted, that albeit, that in the true place of the Sunne there may be in that time so much difference,

yet

yet in the Declination thereof there can be no sensible difference, for we see, that 3. minutes more or lesse in the true place of the Sunne, doth not produce above a minute difference of Declination, when the Sunnes Declination is swiftest, which is neare vnto the Equinoctiall point, and being neare vnto the Tropicks, when the Declination doth increase or decrease very slowly three or foure minutes difference in the Sunnes true place, doth not make any difference in the Declination at all : And therefore by that reason may you be well assured, that these Tables being exactly calculated for the yeares aforesaid, will serue you for a very long time without any sensible error.

The third section being the last of the second face, containeth the names, Magnitudes, and Declinations of 54. notable fixed Starres, with their right assention in houres and minutes, most commodious to finde the elevation of the Pole, whose vse followeth afterward.

Propositions to bee wrought by the Ephemerides or Sea-mans Kalender, *as followeth.*

To know the Moones change.

1 TO know the day and houre of Coniunction or change of the Moone, first looke in the first Page of this Ephemerides, right against the yeare of our Lord, for the Prime number, serving to that yeare : which number keeping in memory, turne to the month in which you desire the Change of the Moone, and in the first Columne of the said Month vnder the title Prime, looke for ỹ Prime number which you kept in memorie, which Prime numbers are there all in rowes all letters, and right against the saide Prime number in the next Columne, is the number of the Day of the Month on which the Moone changes : and if there be any figures

with

with the Prime number, marke whether it be before or after the said Prime number, for if it be before, it sheweth the Moone to change so many houres before noone: if after, it sheweth so many houres after noone: but if there be no figures at all with the Prime number, then the Moone changes iust at noone.

As for Example.

In the yeare 1618. I would knowe in June vpon what day and houre of the said month the Moone changes: In the first page being an almanack of 24. yearts: for the Prime, Epact, Dominical Letter and moueable Feasts, I find the Prime for that yeare to be 4. which keeping in memorie I turne to June, and in the first colume thereof vnder the title Prime, among the numerall Letters I seeke for iiii which I find right against the 12. day of the month, thus 11. iiii with the figure of 11. before it which sheweth that in June 1618. the Moone changes the 12. day, 11. houres before noone, which is at one a clocke in the morning.

Againe, in September the same yere, the Prime iiii vnder the title Prime in the month of September I find the Prime aforesaid right against the 8. day of the month, with the figure 9. after it, and further against it in the third colume, among the letters for the daies of the weeke, is the letter F. which by reason that D. is the Dominicall or Sunday letter for that yeare, F. stands for tuesday: so then I conclude, that in September 1618. the moone shall change the 8. day being tuesday 9. houres after noone.

Of the full and quarters of the Moone.

2. The next thing to be considered herein, is the first quarter, the full Moone, and the last quarter thereof, which is thus done: to the time of her change adde 7. daies and 6. houres, sheweth the first quarter, that doubled sheweth the opposition or full: and thereto againe the saide 7. daies, 6. houres added, makes the time of the last quarter.

To

To know what signe the Moone is in.

3. A third thing needfull to be knowne, is in what signe the Moone is at all times, which may thus be done: vpon the change day next before your day required, looke in the second section of the Ephemerides vnder the yeare desired, and the Columne of the place of the Sunne for the day and yeare, what signe and degree thereof the Sunne was in vpon the said day of the Coniunction, for then were the Sunne and Moone both in one signe and degree: and to knowe what signe she is in any day after, multiply her age by 12. which is the meane motion of the Moone: and from the day of the coniunction, in the columne of the true place of the Sun, tell forward, if the number be so great, out of that month to the next. till you haue told the number of the product of the Moones age, multiplied by 12. and where the said product number ends, in the signe and degree of the Moone.

Example

The 12 of October 1618 I desire the same: in which month by the first proposition, I find the Moone to change the 8. day at 1. a clock after noone: vnder the title second yeare, shewing the true place and Declination of the Sunne for the saide yeare: in the first columne therof I seeke the said 8. day of the month. and right against it in the next columne is 24. 49. minutes of Libra, in which signe and degree both the Sunne and the Moone were at the coniunction: then counting from the change to the 12. day is 4. dayes for the Moones age, that multiply by 12. is 48. which counting from the day of the coniunction along in the columne of the Sunnes place, endes vpon the 25. day of the month of November, against which day is 13. degrees 11. minutes of Capricorne: therefore I conclude the Moone to be in Sagitarius the day, month and yeare aforesaid: otherwise if you multiply the Moones age by 2. and deuide the product by 5. the quotient shewes the whole signe, and the remainer so many times 6. degrees as the Moone is gone from that place of the Zodiacke where she was in the coniunction.

The moones comming to the meridian, with the time of her riſing and ſetting.

4. Multiplie the Moones age by 12. and diuide the product by 15. the quotient ſhewth the houres of ☽ Moones being South, and if any thing remaine after the diuiſion, for euery vnity that remaines adde 4. minutes becauſe 15. degrées make an houre of time, and 4. minutes a degrée. That is done, learne by the third propoſition what ſigne the Moone is in, and then looke out in the ſecond ſection what time and day of the yeare the Sunne poſſeſſeth the ſame ſigne and degrée thereof, and right against the ſaid day in the laſt Columne of the firſt ſection, vnder the title length of the day, is the length of the day, the Sunne being in the ſame ſigne in houres and minutes halfe that number of the dates length taken from the time of the Moones being South, ſheweth her riſing, and the ſaid halfe added to the time of her being South, ſheweth her ſetting.

Example

The 17. of October 1618. by the firſt propoſition, I finde the Moone to change that month, the 8. day after noone and the number of dayes betwixt that and the 17. aforeſaid is 9. for the moones age, therefore multiplying 9. (her age) by 12. her meane motion, the product is 108. which diuided by 15. (the degrées anſwering to an houre) the quotient is 7. houres, and 3. remaines, which is ſo many times 4. min. ſo I conclude the moone to be vpon the Meridian the day aforeſaid, at 7. of the clocke and 12. mi. Then by the third propoſition, I finde the moone to be that day in about 13 degrees of Capric. the Sunne being in which place, is aboue the Horizon 7. houres and 42. minutes: which is likewiſe the time of the Moones continuance aboue the Horizon at that time, or at any time being of like age, and in the ſame ſigne: therefore taking halfe 7. houres 42. which is 3. houres 51 minutes from 7. a clocke 42. minutes, the time of the Moones being South, there reſts 3. houres 51. minutes for the time of her riſing. Likewiſe adding theſe houres 51. minutes, to ſeauen houres forty

forty two minutes, maketh 11. houres 35. minutes afternoone, for the time of her setting. Thus you see that the day and yeare aforesaid, the Sunne shall there in our Horizon, rise at 3. a cloche 51. minutes after noone: she shall be South, or upon the Meridiant, at 7. a cloche 42 minutes after noone: she shall sett at 11. a cloche 33. minutes at night: and her continuance above the Horizon, or her shining to us, is 7. 42. houres.

This is a very necessary thing to be knowne, for by her being upon any other point of the Compasse, you may give a very neare gesse, at every houre of the night.

The next thing to be considered in the first section, is the Festiuall dayes, and other dayes of note, which are so common, that they neede no explanation. Onely this: before every feast which is kept Holiday, is set this word Fast.

To know the length of the Day, or the length of the Night, with the rising and setting of the Sunne.

5 All this is performed by the last Colums of the first section, thus: Right against the day of the month desired in the last Colume of the said first section, under the Title length of the day, is the length of the day desired, in houres and minutes: which number substracted from 24. the length of a naturall Day, leaues the length of the Night: and halfe the said number taken from noone, leaues the houre of the Sunnes rising: the other halfe of the day added to noone, sheweth the Sunnes setting.

Example.

The 19. of October this present yeare 1617. under the Tytle Length of the day, right against the said 19. day, is 9. houres 36. minutes, the length of the day: which 9. hou. 36. min. taken from 24. houres, leaues 14. hou. 24. minutes for the length of the night. Then the halfe of 9. houres 36. minutes, which is 4. houres 48. minutes taken from noone, leaues 7. houres 12. min. for the Sunn rising. The same 4. houres 48. minutes added to noone, makes 16. houres 48. minutes, which is 4. houres 48. min. after noone:

By which you ſée that the 17. of October, the length of the day is 9. houres 36 min. the length of the night 14. houres 24 minutes: the Sunne riſeth 12. minutes after 7. in the morning, and ſetteth 48. min. after 4. in the euening.

Thus much for the firſt ſection: the ſecond ſection being ſome parts, ſeruing for ſome ſeuerall yeares, euery page hauing 3. Columnes: the firſt the day of the moneth, the 2. the true place of the Sunne, and the 3. the declination of the Sun agréeing thereto, all the thrée partes being of like qualitie, which are ſo plaine and ſo commonly knowne, that they néede no further explication, albeit that the vſes thereof are manifold, and commodities excellent: For there are many queſtions concerning the Sphere, which can be wrought without the true place of the Sunne knowne, and being ſo much vſe for it, there are ſo fewe meanes for the true knowledge thereof, but onely by the Ephemerides, which euery one cannot haue.

And for that cauſe I haue tranſferred the true place of the Sun in degrées and minutes, out of the beſt Ephemerides into this former Kalender, where it is ready for ſuch as deſire the ſame, or as haue occaſion to vſe the ſame, in working concluſions, or making of Inſtruments Mathematicall: but moſt chiefly I haue héere placed it, to the end that thoſe that ſtand in doubt of the truth of theſe Tables of the Sunnes declination, may at their owne pleaſure make tryall thereof: The order how to doe the ſame is ſet downe in the firſt printed page, after the ſaide Tables, for by the true place of the Sunne, is found his Declination, either North or South: and by his Declination, and obſeruation of the Sunnes Altitude vpon the Meridian, is knowne the height of the Pole or Latitude of the place where you are.

How to vſe the Sunnes Declination, thereby to finde out the Eleuation of the Pole.

5. To finde out the Altitude or height of the Poles, in any ſeuerall Latitude, viz. How much the Pole is raiſed aboue your Horizon in degrées and minutes, It is néceſſarie firſt to take by obſeruation,

obſeruation, the [illegible] meridian altitude [illegible], by taking the [illegible] that day, [illegible] or [illegible]; being thus [illegible] upon the [illegible]: [illegible] in [illegible]. [illegible] and alſo the day of the moneth, looke in the Kalender before [illegible], for the moneth and day thereof; and right againſt the ſame day of the moneth, toward the right hand, vnder the Title Declinacion of the Sunne, you ſhall ſee the ſeuerall yeares, which the ſaid Tables of Declination ſerue [illegible]. If it be the Leape yeare, looke in the [illegible] of the ſaid foure Tables, vnder the Title Leape yeare: If it be the firſt yeare after the Leape yeare, then reſort to the ſecond of the ſaid Tables vnder the title Firſt: and ſo of the ſecond and third, and after thoſe foure yeares are paſt, come backe againe to the firſt, and [illegible] as you [illegible]: Then (as I ſaid) hauing found out the Moneth, Day, and yeare, direct your eye [illegible] toward the foote of the Table, in that Table which ſerues to the yeare propoſed, till you finde a number making a right angle, with the day of your moneth: or more plainely; Looke what number in the laſt Columne of your yeare, is right againſt the day of your moneth: which numbers are the Declination for the day deſired: and being two numbers in the ſaid Columne, the firſt are Degrées, the other Minutes: then regard alſo, whether the Sunne hath North declination or South declination, which is ſet [illegible] [illegible] the ſeuerall ſpaces: where by the way you ſhall note, that from the Suns entrance into Aries, which is the 11. of March, till his entrance into Libra, the 13. of September, he hath North Declination: and from the ſaid 13. of September till his entrance into Aries againe, South Declination: the ſaid declination increaſing according to the Sunnes progreſſe through the Signes, from his entrance into Aries, till his entrance into Cancer: and decreaſing from Cancer to the beginning of Libra. Then againe increaſing from Libra to Capricorne, and decreaſing from Capric. to the end of Piſces, and beginning of Aries. Aries, Taurus, Gemini, Cancer, Leo, and Virgo, being Signes hauing North decli-

nation

ration from the Equinoctiall Circle: as Libra, Scorpio, Sagitarius, Capricornus, Aquarius and Pisces; South signes, having South Declination from the said Circle: then knowing (as I have said) the Meridian Altitude of the Sunne, the Declination of the Sunne, and whether the Sunne hath North or South declination, as these foure things are all wayes to be observed, in obtaining the height of the Pole. If the Declination be North, subtract the declination from the Meridian Altitude, the remainer is the elevation of the intersection, or cutting of the Equinoctiall with the Meridian above the Horizon, which in common tearmes is the elevation of the Equinoctiall above the Horizon: which height of the Equinoctiall, taken from 90. leaveth the height of the pole, or the Latitude of the place of your observation. But contrariwise, if the Sunne hath south declination, adde the said declination to the meridian Altitude, the product is the height of the Equinoctiall, which like wise taken from 90. leaveth also the height of the Pole.

Example

I observed the 11. of Iune 1616. in the Cittie of London, and found the Meridian Altitude of the Sunne to be 58. degrées 56. minutes, and the Declination of the Sunne north 20. degrées 28. minutes: Being that the Declination was north, I subtracted 20. deg. 28 minutes, the Declination of the Sunne from 58. degrées 56. minutes, the height of the Sunne at noone: the remainer was 38. deg. 18. min. the height of the Equinoctiall: that taken from 90. leaues 51. degrées 32. minutes, for the height of the Pole, or Latitude of London.

This rule is to be understood, when you are betweene the Equinoctiall and the North pole, and the Sunne to the southward of you: But if you should be betwéene the Equinoctiall and the South pole, and the Sunne north from you, then you must worke contrary: for then, if the Sunne hath south Declination, you must subtract the Declination from the Meridian altitude, and if the Sunne hath North declination, you must adde the said Declination to the meridian Altitude.

For

For example.

Being at Sea to the southwards of the Line, the fourth of January, 1616. suppose that you obserue the height of the Sunne at none, and finde it to be 66. degrées, 20. minutes, then you shall finde the declination to be 21. degrées 25. minutes to the southwards, which subtracted from 66. degrées 20. minutes, the Meridian Altitude, leaues 44. degrées 55. minutes, for the height of the Equinoctiall; that taken from 90. rests 45. deg. 5. minuts, for the height of the South pole aboue the Horizon.

Againe, suppose that being at Sea, the 10. of May 1616. and obseruing the Sunne, you take his Altitude at none 60. deg. 30. minutes, and his Declination then is 20. deg. 6. min. northward, but then not hauing obserued long before, you knowe not whether you are to the northward of ỹ Equinoctial, or to ỹ southward of ỹ said Line: to know which, set the Sun by your Compas, and marke which way the shadow of the Sun striketh; For if he casteth his shadow the same way that his declination is, then is the Sunne betwixt the Equinoctiall and you. Your selfe being also the same way that the sunnes Declination is: and therefore subtracting the Declination 20. degrées 6. minutes, from 60. degrées 30. minutes the Meridian Altitude: rests 40. deg. 24. min. the height of the Equinoctiall: the complement whereof 49. degrées 36. minutes is the eleuation of the North pole: but if the Sun casts his shadow contrary to his Declination, that is to say: If hauing North declination, his shadow goeth southward, or hauing South Declination, casts his shadow Northward: Then either the Equinoctiall shall be betwixt you and the Sun, or you in the Equinoctiall; or else you shalbe betwixt the Equinoctiall and the Sunne: which to know, adde the Declination and the meridian Altitude for the day proposed together, If the summe of the addition be lesse then 90. degrees, so much as it wanteth of 90. deg, shall you be distant from the Equinoctiall, that way which the shadow striketh: If it be iust 90. degrées, then are you vnder the Equinoctiall. Againe, if ỹ said Meridian Altitude and Declination added, passeth 90. degr. then so much as is ouer-plus, shall you be from the Equinoctiall towards the

Sunne, and then also you shall be betwixt the Equinoctiall and the Sunne, and if you finde the Sunne to be in your Zenith, so much as is the Declination shall you bee from the Equinoctiall, that way that the Sunne declineth: By which reason, if the Sun be in your Zenith, that is, 90. degrées high, and hath no Declination, then are you vnder the Equinoctiall.

How to appropriate the Tables of Declination to any other Meridian.

There is in the vsing of the Sunnes declination, one principall thing to be considered: which is; That a Table of Declination made for any particular place, doth not serue generally for all places, but onely for such places as haue the like, or néere the same Longitude: The reason is, because that the Declination is Calculated according to the true place of the Sunne at noone, at which time the Sunne is vpon the Meridian of that place for which the said Tables are made: But you must note that the Sunne doth not come to the Meridian in all places at a like time, although that in all places the Sunne being vpon the Meridian, makes the middle of that day. But for euery 15. degrée difference of Longitude betwéene any two places, the Sun comes sooner or later to the Meridian, by so many houres: For if the place be 15. degrées to the Eastward of the place prefixed, then the Sunne comes sooner to the Meridian by one houre, and if it be 15. degrées to the Westward, later by an houre. And so consequently more or lesse, according to the difference of Longitude. By which reason, in what part of the world soeuer you be, you may worke for the Declination of the Sunne in that place, by the proportionall partes of 24. houres Declination, to the houre of difference in Longitude.

As for Example.

Being in Brasilia (a part of the west Indies) the 10. of Aprill, this yeare 1616. whose meridian is distant from the Meridian of England, to the westward about 45. deg. which is 3. hou. of time, that the Sunne should come to the Meridian later there then here at London where the Table is made; For when it is 12. a clocke here, it is but 9. there, and being noone there, it is 3. a clocke here.

There-

Therefore to apply this Table to that place, finde the Declination that day the day aforesaid, under our Meridian to be 11. degrees 43 min. at noone, and by reason that when it is 12. a cloche at Brasilia, it is then at London 3. houres past. Therefore by the rule of proportion, I finde what declination the Sunne hath at 3. a cloche after noone, as followeth. I take the difference of declination betweene the day aforesaid, and the next following, which is 20. min. then I say by the rule of 3. if 24. houres give 20. minutes, what gives 3. houres, the time of the difference of Longitude? facit 2. minutes, and 30. seconds, which (because the Declination increases) I adde to the number of the day proposed: so I conclude the declination of the Sunne to be the 10. of Aprill at noone, in the Kingdome of Brasilia, 11. deg. 45. min. omitting the seconds.

Againe, the day and time aforesaid, in the Bay of S. Sebastian, whose Longitude is 58. degrées to the Eastward of London, answering neere to 4. houres of time, so that the Sunne comes sooner to the Meridian in the Bay of S. Sebastian, by 4. houres then at London: by which reason the Declination is lesse there, then at London, because the Declination doth increase: for if the Declination did decrease, it would be more there then at London: and to finde the Declination of the Sunne in the Bay aforesaid; I take the difference betwixt the Declination of the 10. of Aprill, and the Declination of the day next before, being 20. min. Then (I say) if 24. houres gives 20. min. what 4. houres? facit 3. minutes: which deducted from 11. degrées 43. minutes, the Declination of the Sunne the 10. of Aprill aforesaid at London, leaveth 11. degrées 40. minutes: The Declination of the Sunne at noone, in the Bay of S. Sebastian, being that when it is 12. of the clocke there, it is but 8. a clocke at London: or in any place having the same Longitude.

How to observe the height of the Pole by the Starres.

The working hereof by the starres, to finde the height of the Pole, is all alike with the working thereof by the Sunne: for if you observe any Starre upon the Meridian, looke in the third

middle section of the Ephemerides, amongst the months for the name of the starre which you obserued, wherewith you shall find his Declination either North or South, and the right ascention thereof in houres and minutes: and hauing taken the Altitude of any starre vpon the Meridian, you haue no more to worke in the table but this: but the Declination, which if it be North, take the declination of the starre from the height thereof: The remainder taken from 90. leaueth the height of the pole: but if the starre hath south Declination adde the declination with the altitude taken, and the product thereof taken from 90. leaues the height of the Pole: also to finde the time of any Starres comming to the Meridian, is set downe after the Table of the Sunnes right ascention.

Example

The 25. of November 1617. I obserued a Starre of the second bigness in the shoulder of Pegasus, or the Flying-Horse, about 8. of the clocke in the Euening, and found the Meridian Altitude thereof to be 51. degrees 26. minutes: and in the Kalender, in the second Face thereof, I finde the said starre to haue 12. degrees, 58. min. North Declination: which taken from 51. degrees, 26. minutes, the height obserued leaues 38. degrees 28. minutes the height of the Equinoctiall: The complement whereof 51. deg. 32. minutes, is the height of the North Pole at London.

And so consequently for all those Starres, whose Declination is taken from the Equinoctiall: but for those starres which are any thing neare to the Pole, whose distance or Declination is counted from the Pole, their working is thus: You must note, that being any thing farre to the Northward, some of those starres will be twise vpon the Meridian, viz. once aboue the Pole, and once vnder the Pole: Therefore if you obserue any starre vpon the Meridian vnder the Pole, adde the distance of the saide starre from the Pole to your Altitude obserued, the totall is the height of the Pole: But if you obserue any starre vpon the Meridian aboue the Pole, so much as is the distance or Declination of the said starre from the Pole, you must take from the Altitude taken, the remainder is the height of the Pole.

As

As for Example.

If at London you obserue the former Guard ſtarre beneath the Pole vpon the Meridian, you ſhall finde it to be 37 degrées, 21 minutes, to which if you adde 14. degrées, 11. minutes, the diſtance of the ſaid ſtarre from the Pole. the totall is 51. degr. 32. min. the height of the North pole at London. Againe, the ſame ſtarre obſerued vpon the Meridian aboue the Pole is 65. degrées, 43. minutes. from which 14. deg. 11. min: the diſtance aforeſaid taken, leaueth 51. degrées 32. minutes as before.

Note that being ſtarre Northward, thoſe ſtarres betweene the Equinoctiall and the Tropicke of Cancer, are beſt to obſerue, and being betweene the ſaid Tropicke and the Equinoctiall, thoſe ſtarres about the Pole are fitteſt for obſeruation, and for thoſe that transit ſtarre beyond the line to the South wards: the like order muſt be kept by the ſtarres, betweene the Equinoctiall and the Tropick of Capricornus, and thoſe that are neare the ſouth Pole.

And whereas the North-ſtarre it ſelfe being very neere vnto the Pole, is the fitteſt ſtarre for to be obſerued, by reaſon of the neareneſſe thereto, I haue for your further eaſe, made an exact Table for the declination of the north Starre from the Diameter of the Poles Circle, deſcribed by the North ſtarre, which may be alſo, or rather called the Elevation or depreſſion vpon every point of the Compaſſe, being very commodious, by reaſon whereas the other Starres are only to be obſerued vpon the Meridian. This ſaid North ſtarre by the helpe of this Table following, may be obſerued at any time of the night, whoſe vſe followeth after the ſaid Table.

This

	Pointes of the Compasse,		Degrees	Minutes	Of Declination
	N.W.b.W		0	0	
	North west		0	34	
	N.w.b.N.		1	6	
If the	N.N.W.	Then	1	36	
guards	N. by W.	the	2	4	Vnder
be	North.	Load	2	24	ỹ Pole
	N. by E.	ſtar is	2	40	
	N.N.E.		2	50	
	N.E.by N.		2	52	
	North Eaſt		2	50	
	N.E.by E.		2	40	
	E.N.E.		2	24	
	E.by N.		2	4	
	Eaſt.		1	37	
	E.by S.		1	6	
	E.S.E.		0	34	
	S.E.by E.		0	0	
	South Eaſt.		0	34	
	S.E.by S.		1	6	
If the	S.S.E.	Then	1	36	
guards	S. by E.	the	2	4	Aboue
be	South.	Load	2	24	ỹ Pole
	S.by W.	ſtar is	2	40	
	S.S.W.		2	50	
	S.W.by S.		2	52	
	S:W.		2	50	
	S.W.byW		2	40	
	W.S.W		2	24	
	W.by S.		2	4	
	Weſt.		1	36	
	W.by N.		1	6	
	W.N.W.		0	34	

This former table ſheweth how much the North Starre is, either aboue or beneath the Pole, the Guards being vpon any point of the Compaſſe.

THe vſe of which Table is thus: hauing obſerued the Altitude of the North ſtarre, marke ſo neere as you may, vpon what point of the Compaſſe the Guards then are: which knowne, reſort to this Table, and finding therein the ſame point vpon which the Guards were at your obſeruation, right againſt the ſame is the number of Degrées and minutes, which the ſtarre is either aboue or beneath the Pole, which number ſo found, if it be aboue the Pole muſt be ſubſtracted from your Altitude taken, and if vnder the pole, it muſt be added to the ſaid Altitude taken: which totall added, or remainer ſubſtracted, is the true height of the Pole it ſelfe.

As

As for Example.

Obſerving the North ſtarre to be 58. degrées 30. minutes, when the Guards are at the North-eaſt, I looke in the Table for the North-eaſt point of the Compaſſe, and right againſt the ſame I finde 2. degrées 50. minutes vnder the Pole, which being that the north-ſtarre is vnder the Pole, I adde his declination 2. degr. 50. min. to 58. deg. 30. minutes, his Altitude obſerued, and the totall 61. degrées 20. minutes, is the iuſt height of the Pole it ſelfe in that place.

Againe, obſerving the North ſtarre to be 50. degrées 15. min. aboue the Horizon, when the Guardes are vpon the South-eaſt point of the Compaſſe, I looke for Southeaſt in the Table, and right againſt the ſame is 34. minutes aboue the Pole, which being that the Starre is then ſo much higher then the Pole it ſelfe, I ſubſtract 34. minutes, the Declination of the Starre from 50. degrées 15. minutes the Altitude taken, and the remainer 49. deg. 41. minutes, is the perfit height of the Pole aboue the Horizon in the ſaid place of obſeruation.

And now hauing made plaine vnto you, the vſe and profits of the ſaid table, it being indéed as neceſſary and commodious for the Mariners vſe, as any rule whatſoeuer, it reſteth now to ſpeake ſomewhat more particularly of the other fixed Starres, ſet downe in the former Kalender, or Ephemerides, whoſe vſe is manifold and very excellent, but their vſe for the finding of the Poles elevation by their Declination, obſerued at their being vpon the Meridian, being formerly ſhewed, it is now onely requiſite to explaine vnto you, a briefe and eaſie methode for the exact and ready finding of the true time of any of the ſaid fixed ſtarres comming to the Meridian, at which time they are onely fit for to be obſerued: for the knowledge whereof, I haue héere placed a Table of the right aſcention of the Sun for euery day of each month throughout the whole yeare, according to his true place for euery of the ſaid dayes, formerly ſet downe in the Kalender or Ephemerides: the vſe whereof followeth after the ſaid Table.

A Table

A Table of the Sunnes

Dayes	Ianuar. H. M.	Febru. H. M	March H. M.	Aprill. H. M.	May. H. M.	Iune. H. M.
1	19 30	21 39	23 25	1 16	3 11	5 15
2	34	43	28	22	15	19
3	39	47	32	26	19	23
4	43	50	36	29	23	27
5	47	54	40	33	27	31
6	52	58	44	36	30	36
7	56	22 2	47	40	34	40
8	20 0	6	51	43	38	45
9	4	9	55	47	42	49
10	8	14	58	51	46	53
11	13	18	0 2	55	50	57
12	17	21	6	58	54	6 1
13	22	25	9	2 2	58	5
14	26	29	12	6	4 2	9
15	30	32	16	10	7	13
16	34	36	20	14	11	18
17	38	40	23	18	15	22
18	42	44	27	22	19	26
19	46	48	31	26	23	30
20	50	52	35	30	27	34
21	54	56	38	33	31	38
22	58	59	42	37	35	42
23	21 3	23 3	46	41	39	46
24	7	7	49	44	43	51
25	11	10	53	48	47	55
26	15	14	57	52	51	59
27	19	18	1 0	56	56	7 3
28	23	22	1 3	3 0	5 0	7
29	27		1 7	4	3	11
30	31		1 11	7	4	15
31	35		1 15		11	

right aſcention in Houres and Minutes.

Dayes	Iulie. H. M.	Augu. H. M	Septé. H. M.	Octo. H. M.	Nouē. H. M.	Decēb H. M.
1	7 19	9 22	11 16	13 5	15 5	17 12
2	23	26	20	8	9	17
3	27	30	23	12	13	21
4	31	33	27	16	17	25
5	35	36	30	19	21	30
6	40	40	33	23	25	34
7	44	44	37	27	29	39
8	48	48	41	31	33	43
9	52	52	44	34	37	47
10	56	56	48	38	42	52
11	8 0	59	52	42	46	56
12	4	10 3	55	45	50	18 0
13	8	7	59	49	54	5
14	12	11	12 3	53	58	10
15	16	15	7	57	16 3	14
16	20	18	11	14 1	7	18
17	24	22	14	5	11	23
18	28	26	18	9	16	27
19	31	29	22	13	20	32
20	35	33	25	17	24	36
21	39	36	29	20	28	41
22	43	40	32	24	33	45
23	47	44	36	28	37	50
24	51	47	40	32	41	55
25	55	51	43	36	46	59
26	59	54	47	40	50	19 3
27	9 3	58	51	44	55	7
28	7	11 2	54	48	59	12
29	11	6	58	53	17 3	16
30	15	9	13 2	57	8	21
31	19	13		15 1		25

¶ A Declaration of the former Table.

I Thinke it not amisse, before I shew the vse of the former Table of right ascention, for the finding of the time of any Starres coming to the Meridian, to explaine vnto you what we call right ascention. Know therefore, that in the Sphear there is right ascention, oblique ascention, and meane ascention, which haue all seuerall definitions: but the rest being impertinent, I will onely speake of right ascention, which is thus defined: Right ascention is that portion of the Equinoctiall which commeth to the Meridian, or Mon-sted with any Starre, or any part of the Ecliptick: or more plainely, it is that number of degrees of the Equinoctiall, comprised betweixt the Vernall equinoctiall point, or intersection of the said Equinoctiall Circle, and the first minute of Aries, and that Starre or part of the Ecliptick, which is vpon the Meridian at the day or time desired. As for your better vnderstanding, if the beginning of Aries be vpon the Meridian, or any point or Starre in the said beginning of Aries, then hath the said point or Starre so situated, no right ascention at all, by reason that the beginning of the Equinoctiall commeth to the Meridian therwith: But if the beginning of Cancer, or any Starre in that situation, be vpon the Meridian, then is there with it vnder the same meridian 90. degrees of the Equinoctiall, or 6. houres of time, being that euery 15. degrees of the Equinoctiall answereth to one houre of time, shewing that that Starre or point, which is in the begin-

beginning of Aries, ſhall come to the Meridian 6. houres ſooner then that other which is in the beginning of Cancer, and ſo of others: I doubt not but that theſe few wordes will ſuffice to giue you the better light to that which followeth. Firſt therefore to finde the right aſcenſion of the Sunne at any time: ſeeke for the Month in the head of the Table, and for the day of the month at the left ſide of that face, where the month deſired is, and in the common Angle anſwering to them both, is the houre and minute of the Sunnes right aſcenſion.

As for Example.

I deſire the right aſcenſion of the Sun the 25. of May: firſt in the head of the Table I ſeeke for May, which found in ÿ firſt Columne on the left hand, I ſeeke for 25. and right againſt the ſame in the common Angle, vnder the title May, I finde 4. houres and 47 min. for the right aſcenſion of the Sunne, the ſaid 25. of May.

Theſe things thus knowne and conſidered, it is to be noted, that whereas the Sunne hath a different number for his right aſcenſion euery day, and the Starres keepe euery one ſtill alike number for his peculiar right aſcenſion, the reaſon thereof is this:

The Starres are all fixed in the eight Spheare, in which eight Spheare is alſo the Zodiacke placed, not onely to limit the courſe and progreſſe of the Sunne in his continuall motion, but alſo to giue a certaine limitation to the Starres, who being fixed in any part of the Heauens, that certaine Meridian or Circle of South and North, which paſſeth through the Center of any ſtarre, cutteth alſo in one place or other of the ſaid Zodiacke: which number of Degrées ſo cut in the Zodiacke, is the Longitude or diſtance of the ſaid ſtarre from the beginning of Aries: Now the ſtarre (as I ſaid) being ſo fixed hath no motion, but onely as the whole Frame of the Zodiacke with the eight Spheare, and all the Circles and Starres therein placed, which as is apparant to the ſight, is by the Firſt-mouer carryed round about from Eaſt to Weſt in 24 houres: but the Naturall motion of the ſaid eight Spheare, being from the Weſt to the Eaſt, is ſo ſlowe, that it is vnſenſible; whereas the Sunne being of a very ſwift motion in compariſon of the former, his motion being euery 24. houres, néere vpon a

Degrée

Degrees, little more or lesse, makes his motion from the West to the East in the Zodiacke most apparant by his motion, also discribing the Zodiacke Circle, as never declining from the middle thereof: And further, the Sunne being the ruler of the Day, and director of the Night, is the sole and onely distinguisher of Time: For this is apparant to the view of every one, that the Sunne being upon the Meridian above the Horizon, makes the middle of the day, and being upon the Meridian under the Horizon, makes also the middle of the night which being (as I have said) that the Sun comes alwaies to the Meridian just at 12. a clock, it followes necessarily, that what starre or point in the Zodiacke soeuer, hath greater longitude then the Sunne, his right ascention is also greater then the Sunnes: and looke how much the said right ascention is more then the Sunnes, by so much later then the Sunne must the said star or point come to the said Meridian, proportionally after 15. degrees to an houre, and one degree is 4. minutes of time.

Take this therefore for a generall rule, that if the right ascention of the starre, whose time of comming to the Meridian you desire to knowe, be greater then the right ascention of the Sunne, substract the Sunnes right ascention from the said starres right ascention, and the remainer (if it be lesse then twelue) is the houre and minute that the starre comes to the Meridiã after none: and if the remayner be more then twelue, substract twelue also, and the remainer showes so many hours and minutes after midnight: But if the Sunnes right ascention be greater then the starres right ascention, then add twenty foure houres to the starres right ascention, and substract the Sunnes right ascention therefrom, as before the remainer showes the starres comming to the Meridian after none: If it be lesse then twelue, or if it be more then twelue, twelue also substracted, the remainer showes so many houres and minutes after midnight.

As for Example.

The 15. of November, I desire to knowe at what time Oculus Tauri (or the Bulles eye) will be upon the Meridian: First in the former Table of the Sunnes right ascention, I looke for the 15. of

Nouem-

November, where I finde the Sunnes right ascention for that day to be 16. houres and 3. minutes: and in the Ephemerides among the fixed Starres, I finde the right ascention of the Bulles eye to be 4. houres 13. minutes: which being lesse then the Sunnes right ascention, I adde 24. houres to 4. houres 13. minutes, and from that restill 28. houres 13. minuts: substracting 16. houres 3. minutes. the Sunnes right ascention, restis 12. houres 10. minut. which being more then 12. houres, I take away also 12 houres, and so there restis 10. minutes after midnight, that Oculus Tauri comes to the Meridian the said 15. of November.

Again, the tenth of Aprill, I would know at what time the Lyons taile will be upon the Meridian: in this Table I finde the Sunnes right ascention, the day aforesaid, to be one houre 51. minutes, and in the Kalender I finde the right ascention of the Lyons taile to be 11. houres 29. minutes: Then substracting one houre 51. minutes, the Sunnes right ascention, from 11. houres 29. minutes the Starres right ascention, restis 9. houres 38. minu. shewing that 38. minutes after 9. a cloche at night, the said starre shall be upon the Meridian.

The Monthly time of each Starres being *in rule for Observation.*

January.

Oculus Tauri, the whole constellation of Orion, Hyrcus the Goate, the great Dog, the little Dog, the greatest part of Leo, the Crosiers, Canopus, and the South Tryangle.

February.

The whole constellation of Leo, Arcturus, the Centaure, and the Virgins Spike.

March.

The hinder part of Leo, Hydra, Virgins Spike, the Centaure, Arcturus, the Ballance, and Scorpio.

Aprill.

The Centaure, Ballance, Scorpio, Lyra, and Sagitarius.

May.

Scorpio, Lyra, South crowne, and Eagles heart.

Iune.

South Crowne, Eagles heart, Swans-taile, and the Dolphin.

Iuly.

The Dolphin, Fomahand, and Pegasus shoulder.

August.

Fomahand, Pegasus, Cassiopeia, Andromeda, the Whale, and the Ramme.

September.

Cassiopeia, Andromeda, the Whale, the Ramme, Medusa, Perseus, and Eridanus.

October.

All the former of September, and October, Oculus Tauri, Orion, Hyrcus, and the great Dogge, the Croysiers, and Canopus.

Nouember.

All the former of October, with Nouember, the little Dogge, and the South Tryangle.

December.

The Whale, the Ramme, Medusa, Perseus, Eridanus, Oculus Tauri, Hyrcus, Orion, Canopus, great Dogge, little Dogge, Hydra, and Leo, in the Monthes aforesaide, at one time or other of the Night, these Starres are vpon the Meridian.

Hauing sufficiently Explained vnto you the manner and way how both by the Sunne and Starres to attaine to the true height of the Pole, or Latitude of any place; I purpose now God willing to speake somewhat of the Longitude: which as the former is most easie, and the finding thereof knowne almost to all sea men, so is the other as vncertaine, and hath not yet hitherto beene found out or knowne exactly to any, albeit that many Learned men and of great experience, haue laboured very earnestly for the same, and many good meanes haue they inuented, as helpes and assistance vnto Mariners in their long Nauigations and Trauells, by which, though with great labour, care & industrie, they transport themselues to the vtmost Regions of the world, with farre more ease and facilitie they might doe it, if they could as

perfectly

perfectly and readily finde the Longitude at all times, as they may the Latitude: for then hauing sayled many dayes in vnknowne pathes vpon the large and spacious Seas, and indured all those vnindurable troubles, miseries, and vnspeakeable calamities, which doe for the most part attend vpon Long-voyages: yet after all this, if vpon the first faire opportunitie, they could readily with the Latitude, finde also the Longitude, their forepassed troubles would be ioyfully remedied, being that these two (like louing sisters) would apply much pleasing comfort to their colde stomacks, after their tedious trauels, by giuing them the true pricke or place of their then present being. Peter Appian, and Gemma Frisius, hath written thereof, as also some others: but truely in my opinion, it was neuer brought to such exquisite perfection, as it is now a dayes; and for me to write thereof, were but as it were to set vp a candle at noone dayes, rather to shew mine owne folly, then to lighten those that know a better way then my selfe: in which saying, well may Apelles saying, Ne sutor vltra crepidam, be applyed vnto mée: But for my excuse I doe intreat the iudicious to perswade themselues, that it is farre from my thought to set downe any thing in this for a president vnto them, but onely in good will to shew my opinion thereof, to the Ignorant, being as followeth.

First therefore, the Latitude being knowne by finding the Longitude also, you haue the true pricke or place in the Globe, or Carde, where your Ship is, which to finde neerest is two wayes, one by dead Reckoning, the other by Obseruation: but dead Reckoning (as they call it) béeing as I take it most vsed, I will speake first thereof, by which if it were possible that this reckoning could exactly and precisely be kept, it would giue both Latitude and Longitude without any obseruation at all: The different Latitude being onely the distance that the Ship is departed from the Parallell where shée last was, either Northward or Southward: and Longitude being the distance that shée is departed from the Meridian, either Eastward or Westward: For the knowledge whereof, these thinges are principally to be considered.

Firſt, the true pricke or place of the ſhip is being at the beginning of the voyage.

Secondly, a ſounde and experimentall iudgement of the way that the ſhip maketh, with euery ſhift of winde.

Thirdly, to knowe exactly how much the Compaſſe doth varie from the true North or South point, vpon which the needle is touched, either Eaſtward or weſtward, in as many ſeuerall places as conueniently may be obſerued.

Fourthly, to note diligently the Floods or Currents, which may cauſe the ſhips way to be more Leeward, or otherwiſe then expectation, and to giue allowance of her courſe and way accordingly.

Fiftly, the ſeuerall points of the Compaſſe that ſhe maketh her courſe good vpon, and what way ſhe hath made vpon euery point.

Sixtly, to bring thoſe ſeuerall courſes into one ſtraight line, thereby to know what courſe ſhe hath made good, with the neareſt diſtance vpon the ſaid point or Rombe, that ſhe hath made her way good vpon.

And laſtly, knowing how many leagues doth raiſe or lay a degree vpon the ſaid Rombe, the true reckening of your ſaid courſe and diſtance, giues you the difference of Latit. or the paralel where the ſhip then is: and alſo knowing how many leagues anſwer to a degree of eaſt and weſt in the ſaid paralell, the courſe, diſtance and Latitude giues the difference of Longitude or the Meridian, vnder which the ſhip then is: the interſection of which ſaid paralell and Meridian, is the pricke or place of the ſhips then being, of which things I will ſpeake more particularly afterward.

Now it reſteth to ſpeake ſomthing of knowing the Longitude onely by obſeruation, which is very neceſſarie to be knowne, that thereby the one may make tryall of the other, being that if the account by dead reckoning, and alſo by obſeruation, doe both agree in the Latitude and Longitude, then may you be well aſſured, that you know truely the place where your ſhip are, which Longitude by obſeruation is thus knowne: prepare a very perfect and true running glaſſe, which may precisely runne 24. houres without error, and about the time that you purpoſe to ſet ſaile, ſet the ſaide

glaſſe

glaſſe a running iuſt at twelue a clocke, when the Sunne is vpon the Meridian: and being runne out, be ſure to turne the ſaid glaſſe inſtantly as it is out, not loſing any time in the turning of it, and ſo hauing very warily kept the ſaid Glaſſe till you thinke good to make an obſeruation, at which time it is requiſite to haue in readineſſe a halfe houre-glaſſe, and a minute glaſſe, that if the 24. houre-glaſſe be out before the Sunne come to the Meridian, then ſo ſoone as it is out, to turne the halfe houre-glaſſe or min. glaſſe, as you ſée occaſion, thereby to know preſently how much the 24. houre-glaſſe is out before the Sunne comes to the Meridian: for if the Sunne is vpon the Meridian iuſt when the 24. houre-glaſſe is out, then you may aſſure your ſelfe that you haue ſayled North or South, and are ſtill vnder the ſame Meridian that you were at at the firſt: but if the 24. houre-glaſſe be out before the Sunne come to the Meridian, for euery foure minutes that the glaſſe is out before noone, your difference of Longitude is one degrée to the weſtward, and for euery houre 15. degrées. And contrarie, if the Sunne come to the Meridian before the glaſſe is out, then according to the ſame proportion of time, is your difference of Longitude to the Eaſtward, which difference of Longitude, if you multiply by the number of miles anſwerable to a degrée of Longitude in that Latitude where you then finde your ſelfe to be, the product giues the miles of diſtance, that you are either to the eaſtward or weſtward of the Meridian, that you departed from.

The like may alſo be effected by any of thoſe fixed Starres, whoſe true time of comming to the Meridian you know: For if the accompt of time preciſely kept by your glaſſe, and the ſtarres comming to the Meridian as you finde by your table of right aſcention doe iuſtly agree, then are you ſtill vnder one and the ſame Meridian, but if the time be paſt by your accompt, that the ſaid Starre ſhould be vpon the Meridian before the Starre doth come to the Meridian, for euery houre that the ſtarre comes to the Meridian after the ſaid time paſt, your difference of Longitude is 15. degrees to the Weſtward, and for euery houre that the ſtarre comes to the Meridian before, by your account, of time truely kept, it ſhould be vpon the Meridian, your difference of Longitude

is 15. degrées to the Eastward. Thus much shall suffice to haue spoken concerning my opinion for finding the Longitude at Sea by obseruation, and now it rests to speake somewhat of some necessarie helpes, for the finding thereof by dead reckoning, as is before promised.

Of the variation of the Compasse.

COncerning the Variation of the Compasse, it hath béene very learnedly treated of by diuers of our owne Countrymen, and in our vulgar tongue, and namely by Master Norman and Master Burrowes, in their Bookes called the New Attractiue, and Variation of the Compasse: And since that, most excellently and ingeniously written of by that rare and learned Mathematician of our time, Maister Wright, in his booke of the Correction of errors in Nauigation: as also in his Translation called the Hauen-finding Art: In which respect it is needlesse for me héere to write any thing thereof, onely let it suffice to speake a little thereof, as being necessary to the knowledge of the foregoing matter, for them that would willingly note how much the Compasse doth varie in seuerall places of their Sayling. I thinke it best to haue the Néedles of their Compasses touched vpon a good stone, and so placed directly vnder the North point of the Flie, without allowing any Variation at all, the outer edge of the said Flie to be graduated each quarter into 90. degrées, for the ready reckoning of the degrées that the Compasse doth varie from the true North or South, either towards the East or West: ouer which flie, it is necessary to haue a round circle of brasse, with two sightes vpon the same, the one directly against the other, at opposite pointes to be raised perpendicularly where occasion shall serue: which circle, with the sights thereon, as I haue said, being placed vpon the glasse, ouer the Flie, within the bore, where the Compasse is, when you would obserue the Variation of the Compasse iust, either at the Sunns rising or setting, turne the sightes in the brasse circle towardes the Sunne, and looking through the same, marke precisely how many degrées, the Sun riseth or setteth from ẏ east or west point of the Fly or Compasse: For if the Sunne be in the Equinoctiall, hauing then no amplitude, so much as is the difference of the Sunnes rising or

setting

ſetting from the eaſt or weſt points, ſhewed by the Compaſſe, is the Variation of the Compaſſe, from the true north or ſouth: but if the Sunne be either to the Northward or ſouthward of the Equinoctiall, having amplitude: then is there a reſpect alſo to be had to the Sunnes amplitude; as thus: If the Sunne haue north or ſouth amplitude, and that you obſerue the Sunne to riſe or ſett ſo much from the Eaſt or weſt point of the Compaſſe, as is the Sunnes amplitude, and likewiſe the ſame way that the amplitude is, then hath the Compaſſe no variation: but if the Sunne hauing North amplitude, riſeth notwithſtanding more northerly by your Compaſſe, then by the ſaid amplitude it ſhould doe, the degrées of true amplitude, deducted from the amplitude, which the Compaſſe ſheweth, leaueth the variation of the Compaſſe to the Eaſtward of the North: but if the true amplitude be greater, then the Compaſſe ſheweth, the one deducted from the other, leaueth the variation to the Weſtward of the North: and if the amplitude be ſoutherly, and the Compaſſe ſhew the Sunne to riſe northerly, both the differences added together, giues the Variation eaſterly: or if the amplitude be northerly, and the Compaſſe ſhewes it to be ſoutherly, then both the differences added together, giues the variation weſterly. All this is to be vnderſtood, when you obſerue by the amplitude Ortiue, viz. at the Sunnes riſing: for if you obſerue the ſetting thereof, then by adding or deducting the differences betwixt the true amplitude knowne, and the amplitude giuen by the Compaſſe, the totall or remaine ſhewes the Compaſſe to varie ſo much to the contrary ſide: an example will make all this plaine vnto you, which let be thus propoſed. Suppoſe that being at Sea, you finde by the Table of lines hereafter ſet downe (or by ſome other meanes) the Suns amplitude at that time to be 20. degrées to the northward, and ſetting the Sun at his riſing by the Compas (as is before ſhewed) you finde that the Sun riſeth 35 deg. to the northward of ẏ East, which is ſomewhat to ẏ northward of the northeaſt and by eaſt point, therefore ſubſtracting 20. deg. the Suns true Amplit. from 35. deg. the amplitude which ẏ Comp. ſheweth, the remaine being 15. deg. ſheweth the compas to be ſo much varied from the Nor. to the eaſtward,

which is 1. whole point, and about 1. third: otherwise the Sunne hauing the same amplitude northerly, (as is afore said) and setting him at his going downe by the Compasse, the said Compas sheweth him to set onely 5. degrées to the northward of the west, which deducted from 20. degrées, the true amplitude leaueth 15. degrées for the variation of the Compasse to the Eastward, as before.

Another Example.

Suppose that the Sun hauing 23. degrées of south amplitude, and the Compasse sheweth his amplitude or rising to be 11. degr. northerly, adde 23. degrées the true amplitude with 11. degrées of contrarie amplitude, which the Compas sheweth, and the product 34. degrées, being three whole points and somewhat more, sheweth that the Compasse is so much varied from the true north to the eastward.

Againe, the Sunne hauing the like amplitude southerly, you obserue at his setting, and finde by your Compasse that he setteth 11. degrees northerly, adding the two amplitudes as aforesaide, 23. and 11. the product 34. sheweth the variation so much to the westward, being that in the obseruation at his rising, the east and by north pointes of the Compasse, standeth where the east southeast should be: and at his setting in the other obseruation, the West and by North points of the Compasse, pointeth to the Sunne, in which place should be the West Southwest pointes.

These few words will suffice, being (that albeit to the ignorant they seeme somewhat darke) yet in the practise thereof, they shall finde it I doubt not, but very plaine and easie for their vnderstanding, otherwise there are sundrie sortes of instruments to finde the variation by, but others hauing already written thereof, I haue thought good also to shew my opinion of this plaine and easie way, knowing that the Marriner hauing made experience of many wayes, will onely vse that which he findeth best, both for his ease, profite, and truth thereof. And note that whatsoeuer is here spoken concerning the finding of the variation by the Amplitude, the very like may be also obserued by the Azimuth, which by the Sunne or Starres being to be seene, may at any time be knowne.

How

How many Leagues ſailing vpon any point of the Compaſſe will raiſe or lay a degree of Latitude, and what difference of Longitude you make therewith.

1. 1/3
2. 1
2. 2/3
4. 2/3
5. 7/3
6. 16/3
7. 50/3

THis is ſo common in euery booke, that I néede not to write thereof. but onely being that it is a neceſſarie helpe to that which hath béene before ſpoken of, it is not amiſſe to ſet it héere downe, being as followeth.

Firſt, ſayling South or North you kéepe ſtill one Meridian: and in ſayling 20. Engliſh leagues you either raiſe or depreſſe the Pole one degrée: But if you ſayle vpon the firſt point or Rombe from North or South, either eaſtward or weſtward, you muſt ſayle 20. Leagues and one third part to raiſe or lay a degrée of Latitude: and hauing ſo changed your paralell one degrée, you are alſo departed from your firſt Meridian 4. leagues that way which your courſe was.

Vpon the ſecond point or Rombe from North or South, 21. leagues and one third, raiſe or lay a degrée of Latitude, and your diſtance from the firſt Meridian is 8. leagues and one third.

Sailing vpon the third point, 24. leagues, raiſe or lay a degrée and diſtance from the firſt Meridian, is 13. leagues, and one third.

Vpon the fourth point 28. leagues and one third, raiſe or lay a degrée of Latitude, and diſtance from the meridian, is 20. leagues.

Vpon the fift point, 36. leagues, raiſe or lay a degrée of Latitude, and diſtance from the Meridian is 30. leagues.

Sailing vpon the firſt point or Rombe 52. Leagues and one third, raiſe or lay a degrée, and hauing altered your Latitude one degrée vpon that point, you are departed from the firſt Meridian 48. Leagues and one third.

If you ſayle vpon the ſeauenth point, being the next from the Eaſt or Weſt, you muſt ſayle 102. Leagues, and 2. thirds, before you raiſe or lay the Pole one degrée, and then are you 101. leagues from your firſt Meridian, but if you ſaile Eaſt or Weſt, then are you ſtill in a paralell, and neither raiſe nor lay the Pole at all.

To

To finde the distance betweene any two places, knowing the Longitude and Latitude of them.

IF the two places differ onely in Latitude, then are they both vnder one and the same Meridian: and to know the distance betwixt them in miles or leagues, multiply the number of the degr. of difference, by 60. miles, or 20. leag. the product of which multiplication gives the true distance betweene them in miles or leagu. according as you worke them, being that 60. miles or 20 leagues make one degree of a great Circle: but if the one place haue north Latitude, and the other South, then adde both their Latitudes together, and worke as aforesaid: and if both the places are vnder the Equinoctiall, then haue they no Latitude: And there likewise 60. miles, or 20. leagues make one degree, and the working is like the former, if the difference be vnder 180. degrees: For if the difference be more then 180. substract the said difference from 360. and multiply the remainer by 60. or 20. as before.

These are so plaine and easie, that they neede no Examples: but if they differ both in Longitude and Latitude, or in Longitude onely, in any Parallell beside the Equinoctiall, the working is somewhat more difficult, by reason that the further the Parallels are distant from the Equinoctiall toward either of the Poles, the shorter they are: and the shorter the Parallels are; the fewer minutes or miles make a degree: so that whereas in the Equinoctiall 60. minut. or miles make a degree, in that Parallel where the Pole is raised 52. degrees 37. minutes makes 1. degree, viz. one deg. in the Latit. of 52. in running East or West, answers to 37. miles: for which purpose, as also for diuers necessary vses, I haue here added a Table, shewing the miles of distance and minutes of Time, answerable to a degree, in euery seuerall degr. of Latitude from the Equinoctiall towards either of the Poles: And when you know the miles answerable to a degr. in the Parallell desired, if the difference of the two places be onely in Longitude, multiply the difference of their Longitude by the number of miles answerable to a deg. and the product sheweth the distance in English or Italian miles betwixt the said two places.

Example

Deg. of Lat.	Mi. to a De.	Degr. Latit	Mi. to a De.
0	60	60	30
10	59	61	29
15	58	62	28
18	57	63	27
21	56	64	26
24	55	65	25
26	54	66	24
28	53	67	23
30	52	68	22
32	51	69	21
34	50	70	20
35	49	71	19
37	48	72	18
38	47	73	17
40	46	74	16
41	45	75	15
42	44	76	14
44	43	77	13
46	42	78	12
47	41	79	11
48	40	80	10
49	39	81	9
51	38	82	8
52	37	83	7
53	36	84	6
54	35	85	5
55	34	86	4
57	33	87	3
58	32	88	2
59	31	89	1

Example.

London and Middlebrough haue both in a manner one Lati. viz. about 52. deg. and I finde in this Table, that in the paralell of 52. 37. miles make a degrée of Longitude, the Longi: of London is 25. deg. 50. min. and the Long. of Middlebrough is 29 deg. 40. min. which substracted one from another, leaues 3. deg. 50. min. for the difference of Longit: Then multiplying 3. deg. by 37. miles, the product is 111. miles: then for 50. minut. I say by the rule of thrée, if 60. min. giue 37. miles, what giues 50 minuts? facit néere 31. which added to 111. makes 142. miles, or 47. leagues, and a mile for the distance betwixt London and Middleborough.

But if the twa places differ both in Longit. and Latitude, then is the working more difficult then either of the former: For first you must take the difference of the 2. places in Longit. and then their difference also in Latit. and multiplying the deg. of their difference in Lati. by 60. set the product therof by it selfe, for the first Number: then multiply the difference of Longitude, by the number of miles answerable to each Latit. seuerally, and adde both the products together: the halfe whereof set downe for your second number, and multiplying each of the said 2. numbers into it selfe squarely, adde both the products together, and extracting the square roote thereof, the said square roote is the distance of miles, betwixt the two places desired.

As for Example.

To goe directly in a right line from Callice in France, to Constantinople in Grecia: I finde by the Tables following, that the Long. of Callice 29. deg. 10. min. and the Lati. thereof 50. deg. 40. min. Also the Longit. of Constantinople is 61. deg. 20. min. and the Lat. 44. deg. 40. min. then substracting

the

the lesser Longitude, from the greater, the difference of Longitude is 32. deg. 10. minuts.

Longi. { Constant. 61. deg. 20. min / Callice 29. deg. 10 minuts. / Difference, 32. deg. 10. min }

Also I take the one Latitude from ỳ other, and there rests 6 deg. for the difference thereof, which 6. degrées multiplyed by 60. miles, produceth 360. miles for the distance betwixt the paralell of Callice, and the paralell of Constantinople.

Latit. { Callice, 50. deg. 40. minuts. / Constant. 44. deg. 40. min. / Difference, 6. deg 0. minut. }

Now for the distance betwixt Callice, and the meridian of Constantinople, I multiplie thirtie two degrées ten minutes, the difference of Longitude by thirtie eight, the miles answerable to a degrée in the paralell of Callice, and the product is 1222. miles: Then I multiplie thirtie two degrées ten minutes, the aforesaid difference of Longitude by 42. the miles answering to a degrée in the paralell of Constantinople, which product being 1351. miles, is the distance betwéene Constantinople, and the Meridian of Callice: Those two distances added together make 2573. the halfe whereof, being 1286. is the meane distance betwixt the Meridians of the saide two places: So haue you two Numbers, viz. 360. miles, the distance that the Paralell of Constantinople is to the Southwardes of Callice, and 1286. miles, the distance that Constantinople is to the Eastward of the Paralell of Callice: Therefore if you multiply 360. into it selfe, the product is 129600. and likewise multiplying 1286. into it selfe, the product is 1653796. which both added together, make 1783396. the square rote of which number is ỳ distance desired: which to helpe those that are not perfite in extraction of rotes, I haue héere set downe the working thereof as followeth ——

1 2 2 2	
1 3 5 1	
2 5 7 3	
1 2 8 6	
1653796	
129600	
1783396	
1783396 | 1	
. . . .	

The manner how to extract the square and Cube roote of any number is more plainely taught, toward the ende of the Booke.

First, I set downe the proposed number, with a Quotient, and vnder the last Figure, I put a pricke: and so likewise vnder each other Figure toward the left hand, leauing betwixt each pricke one Figure vnprickt: so haue I vnder this number 4. pricks signifying that the rote must consist of foure Figures, and to finde them

them out, I ſéke what is the greateſt ſquare number ouer the firſt pricke, which is one, therefore I put 1. in the quotient for the firſt figure of the rote, and cancell the figure ouer the firſt pricke: then to finde the ſecond figure of the rote, I multiply the quotient by 20. which being 1. doth neither multiply nor diuide: therefore I ſéke how often 20. is contained in 78. the number of the ſecond prick, which you muſt take no oftner then that ỹ ſquare of the ſaid number being added therewith, may be likewiſe taken there from, ſo I ſée 3. times 20. being 60. and the ſquare of 3. which is 9. added thereto, is 69. which may be taken there from: therefore I put 3. in the quotient, taking 69. from 78. the number ouer the ſecond prick leaues 933 to the third pricke: Then for the 3. figure of the rote, I multiply 13. the quotient by 20. the product is 260. which I ſéke how often it may be taken out of 933. and I finde that 3 times 260, is 780. whereunto the ſquare of 3. being added, makes 789. therefore I put 3. in the quotient and ſubſtracting 789. from 933. reſts 14496. for the fourth pricke: then for the laſt figure of the rote, I multiply 133. ỹ whole quotient already found by 20. and the product is 2660. which may be taken 5. times in 14496. for 5. times 2660. is 13300. vnto which 25. the ſquare of 5. added, makes 13325. therefore I put 5. in the quotient, for the fourth and laſt figure of the rote: and making my ſubſtraction as afore, the works will ſtand as you ſée, by which you may know ỹ ſquare rote of the propoſed number to be 1335. and very néere ½. So I cõclude the true diſtance betwéen Callice and Conſtantinople to be 1335. miles, and néere halfe a mile. The manner how to extract the rote of any number, is ſet downe more at large after the Tables of ſines.

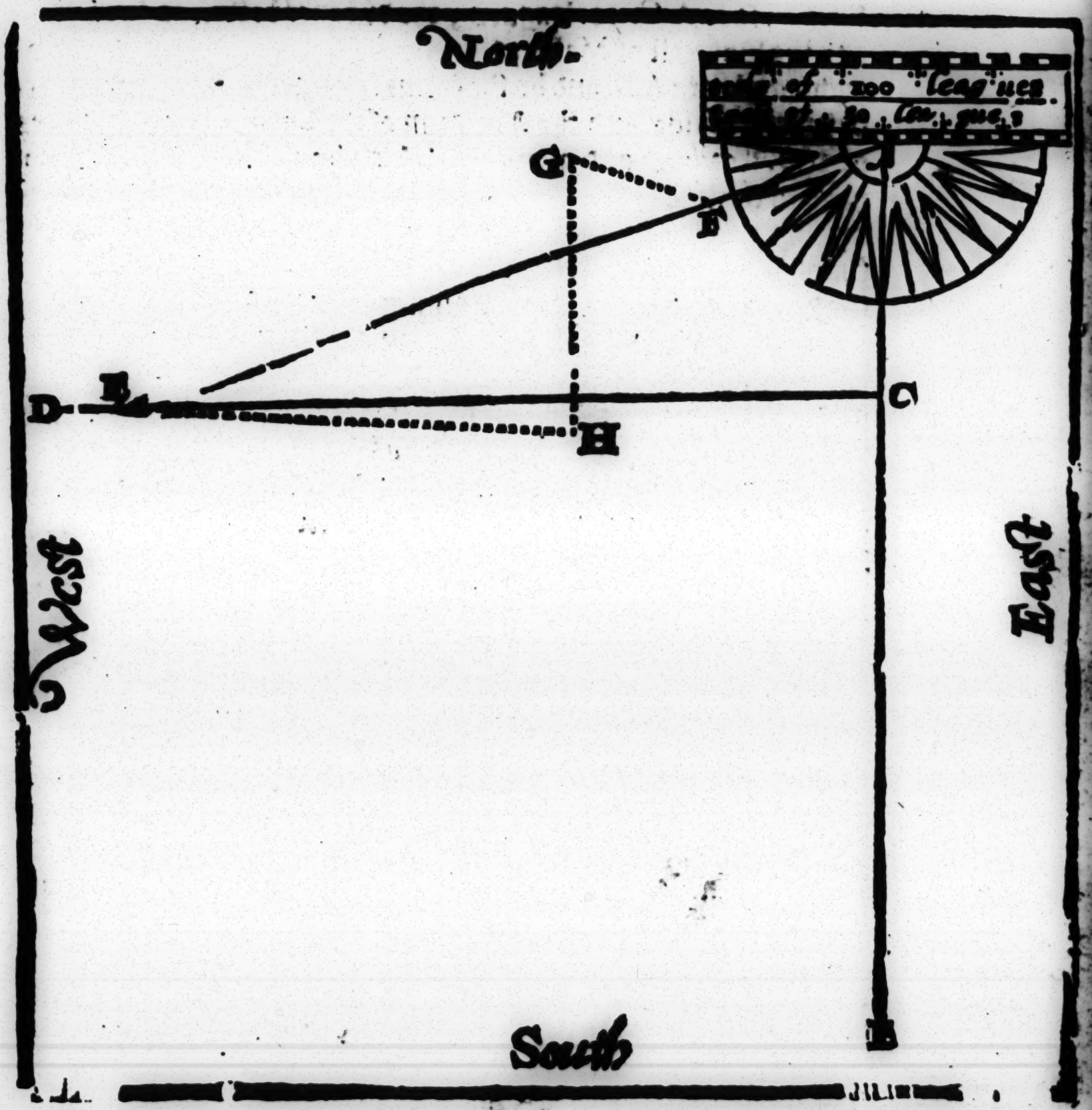
```
  8
1783396   1
.  . . .  ---
1         20
           1
          ---
          20
           3
          ---
          60
           9
          ---
          69

   9
1783396|13
.  . . .----
1
   69     13
          20
          ----
          260
            3
          ----
          780
            9
  1
  844     789
1783396|133
.  . . .----
1         133
  69       20
          ----
  789     2660
             5
------  ------
        13300
------  ------
111        25
88471113325
1783396|1335
.  . . .----
169
 789
 13325
```

The ingenious Mariner may (as by knowledge the true Longitude and Latitude of places, to any place assigned, either as by his Sea Cards, by the helpe of the Transerse board and a Protractor, in this manner: First upon the boarde or paper lyned with Meridians and Paralels, or to them that can make a right Angle upon any pricke or point, a sheete of cleane paper is sufficient to keepe a Transerse upon: To know your course from the place where you are, to any other place assigned: as I say upon your board or paper make a pricke for the place where you then are, and from the said pricke draw a right lyne to represent the Meridian of the same place, then placing the Center of the Protractor upon the said pricke, lay the North or South point of the Flye or protractor, as the place beareth upon the lyne readie drawne. Then by the last Chapter learne the distance of miles betwixt the place where you are, and the paralell of the place you are bound to: or more briefly, what portion of the Meridian is comprized betweene the Latitude of the two places, that distance by the scale of Protractor, apply to the Meridian by you drawne, and where the distance ends, draw another line square, or at right angles to the other, either East or West, as the scituation of the place assigned requireth: and by the former Chapter learne the distance betwixt the Meridian by you drawne, and the Meridian of the other place assigned: which knowne by your scale, apply that distance to your line of East or West, and where that number of distance endes, make another pricke for the true scituation of your place assigned: then laying a thrid or ruler from the Center of the protractor, being the place where you are, and extending it to the other pricke last made, the edge of the ruler or lyne shewes upon the protractor, the point of the Compasse that the place assigned beares from the place where you are: and the scale applyed to the said line or edge of the ruler, shewes the distance: also the distance may be knowne by extracting the square roote, as is before shewed: an example of this, and for the vse of the Transerse board, and so an end.

A Ship being at the Lyzard, in the South west parties of England, whose Longitude and Latitude I finde in the Table following

following to be 18 degrees 30. minutes, and 50. deg. 10. min. is found for an Iland in the Ocean sea called Maida, whose Longitude I finde in the same Table to be 2. degrees 40. minutes, and Latitude 46 deg. 40. min. the difference of their Latitude is 3 deg. 30. minutes, which is 210. miles, or 70. leagues: Therefore from

The Type of a Traverse board and a Protracter.



the pricke or point A. [illegible] the line A B. in the [illegible] [illegible], and [illegible] the [illegible] of the protractor being [illegible] of the Northerne Compasse, [illegible] point whereof representing the North or South (as occaſion ſerues) I lay downe the line A B. and [illegible] 70. leagues (where-of the ſcale on the edge of the protractor containes 100.) from A. towards B. where the ſaid 70. endes, I make a pricke marked with C. ſo is A C. 70. leagues, the diſtance betweene the Lizard and the Paralell of Maida, then from C. I drawe the line C D. at right angles to A B. and by the former chapter I finde the diſtance betweene Maida, and the Meridian of the Lizard to be 629. miles or 209. Leagues, and 2. miles: which by the ſcale aforeſaid applied to the line C D. at the end of the ſaid diſtance, I ſet a pricke marked with E. ſo is the line C E. 209. $\frac{2}{3}$ Leagues, the diſtance that Maida is to the weſtward of the Meridian of the Lizard, or the line A B. then the protract lying as at the firſt, I lay a ruler from the Center thereof, to the laſt pricke E. and with the former ſcale, meaſuring along by the edge of the ruler from A. the firſt pricke to E. the laſt: I finde the diſtance to be 222. leagues, and the ruler cuts the point Weſt and by South, and halfe a point to the Southwards: ſo I conclude the Ile of Maida to be diſtant from the Lizard 222. leagues, and the direct courſe weſt and by ſouth, and halfe a point ſouthwards.

But if the winde ſcant or be contrary, ſo that you cannot ſayle by the direct courſe, then muſt you keepe a reckoning how many leagues you ſayle vpon euery other point: and where you change your courſe, there place the Center of the protract, keeping the Meridian or North and South line of the Protractor paralell, to the Meridian drawne on the Trauerſe bord, and laying a ruler from the Center of the Protractor, along that point vpon which the Ship maketh her way, and to the edge of the ruler ſo placed apply ſo many leagues of the ſcale, as the Ship hath ſayled vpon that point, and then where that number endes, ſet a pricke for the place where the Ship then is, and againe vpon that pricke place the Center of the protractor laying as before the ſouth and North line thereof paralell to the Meridian or South line firſt drawne,

and then laying a ruler to the center of the Protractor being the place where the ship then is, even to the place assigned, it shewes upon the Protractor, the point hee they beare, and the scale applyed thereto, shewes the distance, as in the former example: Having sayled from the Lizard in the right course 50. leagues, being then in the point F. the winde commeth to another point, so that she maketh her way West and by North 40. leagues: at the end of which course, is the letter G. from thence she runneth South 75. leagues: at the end of which course is H. then from H. to know the distance and what course must be kept to the prefixed place of Maida marked with E. I place the Center of the Protractor upon H. and the edge thereof, which is then North and South paralell or equidistant to the first line A. B. which so placed, I lay a ruler from the Center thereof to E. and I finde the course to be West, and halfe a point to the North 125. leagues.

Note, that it is necessary to have upon your Protractor two severall Scales, a greater and a lesser, for the greater the scale is you keepe your reckoning by, the truer shall your account be.

Necessarie questions of Nauigation, with their Answeres.

Question. 1.

IF I sayle from the Paralell of 50. degrees 70. leagues upon a Southwest course, I demaund how much I lay or depresse the Pole, and how many deg. and leag. I depart from the Meridian?

Answ. Pole depressed two degrees 28. minutes, difference of Longitude three degrees, 25. minutes, leagues from the Meridian 49. and $\frac{1}{2}$.

Q. 2. If I sayle from the Paralell of 40. degrees, upon a west Northwest course, untill I raise the Pole 3. degrees 30. minutes, I demaund how many leagues I have sayled? and how many degrees and leagues I have departed from the Meridian?

A Leagues sayled 183. difference Longitude 12. degrees 11 minutes, leagues from the Meridian 169.

Q. 3. From

Q. 3 From the Paralell of 47. deg. if I am sayling 108. leagues between west and north, I raise the Pole 3. degr. I demaund vpon what Rombe I haue sayled: as also how many degrees and leagues I am from the Merid, from whence I began that course:

A. A Rombe northwest and by west, difference Longitude 6. deg. 36. minutes, leagues from the Meridian 90.

Q. 4 If from the Paralell of 50. degrees I sayle so long betweene North and East, till I raise the Pole 6. degrees, and depart from the Merid. 4. deg, I demaund vpon what point of the Compasse I haue sayled, and how many leagues I haue runne:

A. The course is neere North Northeast, leagues runne 126.

Q. 5 If from the Paralell of 50. deg. I sayle Northwest, vntill I am 4. degrees from the Meridian where I began my course, I demaund how many leagues I haue sayled, and how much the Pole is raised:

A. Leagues sayled 70. and 2. thirds, Pole raised 2. degrees, and a halfe.

Q. 6 Two Ships departing from one place in the Paralell of 50. degr, the one in sayling 145. leagues towards the west, hath raised the Pole 4. degrées, and the other hath raised the Pole 7. degrées, and is 95. leagues west from the Meridian of the place from whence he began his course: I demaund by what course the said Ships haue sayled, how many leag. the 2. ships hath sayled, how farre they be a sunder, and by what course they may méete:

A. The first Ship that sayled Northwest and by west: The second hath sayled Northwest by North 172. leagues, they are a sunder 63. leagues, and the course betweene them is North northeast, and South southwest.

Q. 7. Two Ships departing from one place in the Paralell of 60. degrees, the one in sayling 145. leagues towards the west, hath raised the Pole 4. degrees, and the other hath raised the Pole 7. degrees, and is 93. leagues west from the Meridian of the place from whence he began that course: I demaund by what course the said ships haue sayled the way of the 2. ships, how farre they be a sunder, and by what course they may meete:

A. The first Ship hath sayled Northwest and by west, the second

second hath sayled South west and by West 168. leagues, they are 4 under 64. leagues 2 degrees Easterly, course betweene them is North northeast.

Q 8 Two ships sayling from one place in the Paralell of 60. deg. the one sayling 180. leagues Eastwards, hath raised the Pole 5. degrees, I demaund upon what course, and how many leagues the other ship shall sayle to bring himselfe 50. leagues North by west from the first ship, and what they are both departed from their first Meridian?

A. The first ship hath sayled Northeast and by East, and is departed from the Meridian 146. leagues. The second ship must sayle Northeast 3. deg. northerly, leagues 220. and is departed from the Meridian where he began his course 169. leagues.

Q. 9 If I sayle from the Paralell of 50. deg. 100. Leagues North, I demaund what Latitude I am in?

A. In the Latitude of 55. degrees.

Q 10 If I sayle from the Paralel of 50. deg. South, till I lay the Pole 5. deg. I demaund how many leagues I haue sayled?

A. 100. Leagues.

Q. 11 If from Latitude 22. deg. I sayle in the Paralell of 60. deg. 100. leagues East, I demaund what Longitude I am in?

A. In Longitude 32. degrees.

Q. 12 If from Longitude 22. deg. I sayle in the Paralell of 50. deg. to Longitude 10. degrees, I demaund how many leagues I haue sayled?

A. Leagues 154. and a quarter.

Q. 13 If I sayle from Longitude 20. deg. and Latitude 40. to Longitude 350. deg. 27. min. and Latitude 30. degrees, I demaund the Rombe and distance?

A. Course west southwest, distance 520. leagues.

Q 14 From Long. 22. deg. and Latitude 45, deg. northeast 20. leagues, what Longitude and Latitude hath the second place?

A. 23. degrees, Longitude 45. deg. 42. minutes Latitude.

Q 15 From Longitude 23. degrees, and Latitude 45. deg. 42. minuts East and by North 30. leagues, what Longitude and Latitude hath the second place?

A. 25. deg. 9. min. Longitude 46. deg. 5. minutes Latitude.

Q. 16 From Longitude 25. degrées 46. minutes and Latitude 45. degrées 59. minutes East Southeast 50. leagues. What Longitude and latitude hath the second place?

A. Twenty fire degrées 46. minutes Longitude, 45. degrées 31. minutes Latitude.

Q. 17 From Longitude 26. degrées, 53. minutes, and Latitude 45. degrées 31. minutes North 40. leagues. What Longitude and Latitude hath the second place?

A. Longitude 26. degrées 53. minutes, Latitude 47. degrées 31. minutes.

Q. 18 From Longitude 26. degrées 53. minutes, and Latitude 47. degrées 31. minutes 50. leagues West Northwest. What Longitude and Latitude hath the second place?

A. Longitude 23. degrées 57. minutes, Latitude 48. degrées 28. minutes.

Q. 19 From Longitude 23. degrées 57. minutes, and Latitude 48. degrées 28. minutes East Northeast 60 leagues. What Longitude and Latitude hath the second place?

A. Longitude 28. deg. 27. min. Latitude 49. deg. 26. minutes.

¶ Here followeth a briefe Table of ſines for Arethmaticall Calculation, the totall ſine whereof is 10000. with certaine neceſſary propoſitions to be wrought thereby, by which few things propoſed, and the examples thereto annexed, any one that hath either an ingenious ſpirit, or a willing minde to the practiſe of the Mathematicall Sciences, may attaine to much knowledge therein.

A briefe declaration of the ſame.

WHat the Table of Sines is, hath béene very learnedly explained by others, and therefore needleſſe is it for me to diſcourſe thereof: onely take theſe few inſtructions for the helpe of

s of those, which as yet haue no knowledge therein. First knowe, that sayling, which is the principall thing here aymed at, is performed by a true and perfect knowledge of the Spheare, by the projection whereof, all Calculations, Tables calculated, and Instruments for observation are inuented, protracted, framed and made.

What the Spheare is I néede not to discusse, the chiefe or great Circles thereof consisting of 360. degrées, and one quarter thereof being 90. degrées, which quarter being taken from the whole Circumference, consisteth of these thrée particulars, viz. An arch or part of a Circle being indeed 90. degrées, or a quarter of the whole Circle: a right Angle, and two equall sides thereto, of which the one is the base or ground line, the other a perpendicular let fall thereon at right angles, the vtmost endes or extentions of which two lines are the limmits of the foresaid arch, or quarter of a Circle: the which thrée parts so fitted together in their due order, sheweth the perfite platforme of one quarter of the whole Circle, commonly called a Quadrant: the base or ground line whereof being deuided into 10000. equall partes, is Sinus totus or the whole line: and the whole arch or quarter of a Circle into 90. degrées, is the whole arch belonging to the said whole line.

Within which quadrant, any number of degrées or minutes counted from the beginning or first perpendicular, may be called an arch, or part of a circle: and another perpendicular let fall thereof from to the aforesaid base or ground line, the number of equall parts that the said perpendicular falleth vpon, is the right line to the arch giuen: and the complement of the arch giuen, is the remainer thereof, it being taken from 90. degrées or the whole Quadrant. To finde out the right line of any giuen arch, looke in the heade of the Table following for the degrées thereof, and if there be any minutes therewith, looke for the minutes at the left side of the Table, and carrying your eye downeward from the degrée, till you come right against the minutes, the number which you finde in the common angle to them both, is the right line of your giuen arch desired: as if you desire the line of 35. degrées 20. minutes, looke in the head of the Table for 35. and vpon the left side thereof for 20. and in the common square or

angle right against them both, and shall finde 5783. which is the sine of 35. degrées 20. minutes: and if you subtract 35. degrées 20. minutes from 90. degrées, the remainer 54. degrées 40 min. is the complement thereof, whose right sine (found as before is taught) is 8158. what the versed sine is and how found out, is afterward shewed. I doubt not but that these few words will suffice for the explaining of the Table following, whose large and ample vses for Navigation and other the Mathematicall practises the se following exemplaris propositions, will in some reasonable sort make manifest: by which few here proposed and answered, the ingenious may gather the manifold vses thereof, being that indéed the benefite to be reaped thereby is great, and the propositions to be wrought thereby infinite. (Who so desires more perfection in this kind of navigation and generally in all Mathematicall practises, let them spend some time in the study of Piticus; of the doctrine of Triangles, newly translated and published in our English tongue, by Mr. Raph Handson.

Certaine propositions to be wrought by the Table of sines.

The Sunnes true place being knowne, to finde his Declination.

As the whole Sine is to the sine of ☿ greatest declination, so is the sine of the Sunnes distance from the neerest Equinoctiall point, to the sine of the Declination for the day proposed.

Example.

I would know the declination of the Sun the 1. of May 1618. at what time the true place of the Sun being in 20. deg. 25. min. of Taurus, is 50. deg. 25. min. from the beginning of Aries, or the vernall Equinoctiall point, therefore I must multiply the sine of 50. deg. 25. min. the Suns distance from the Equinoctial point, by the sine of 23. deg. 30. min. the greatest declination, and that product must be devided by the whole sine, whose severall sines being found out in the table following, and set in order, the worke will stand thus:

If 90 give 23.30 what 50.25 ☌

10000 3987 7707

Facit 3072. whose neerest arch 17.54. minutes is the true declination of the Sunne, the day and yeare aforesaid. The

The Declination of the Sunne giuen to finde his place in the Zodiacke. Prop. 2.

As the sine of the greatest declination is to the whole sine, so is the sine of the declination for the day proposed to the Sunnes place or distance from the nearest Equinoctiall point.

Example.

The first of May, 1618. I finde that the Declination of the Sun is 17. degrées 54. minutes North, therefore I say

If 23.30 giue 90 what 17.54

3987 10000 3073

Facit 7705. whose arch 50. degrées 24. min. is the Sunnes distance from the vernall Equinoctiall point of Aries, from which taking 30. degrées the whole sine of Aries, the remainer 20. degr. 25. minutes sheweth the Sunne to be so much entred into Taurus, which is the nert signe.

The Latitude and declination of the Sunne giuen, to finde the Amplitude. Prop. 3.

As the sine of the complement of the Latitude is in proportion to the whole sine, so is the sine of the Sunnes declination to the Amplitude.

Example.

The 10. of Aprill, 1616. I desire the amplitude of the Sunne, viz. how much the Sunne doth rise and set from the true East and West point of the Horizon towards the North or South in the Latitude of 51. deg. 40. min. to know which, the worke is thus.

If 38. degrées 20. minutes, the complement of the Latitude giue 90. degr. the arch of the whole sine, what giues 11. degrées 43. minutes the declination of the Sunne?

38. deg. 20. min. 90. 11. 43. minutes,

6202 10000. 2031

Facit 3275. whose arch sought out in the Table of sines, is 19. deg. 7. min. for the amplitude in the day, yeare and place proposed: the same deuided by 11. and 1. quarter, the number of deg. that belongs to a point of the compasse, sheweth one point 7. deg. and 52. minutes, which the Sun riseth and sets to the northward of the East and West, being that the Declination is North, for if the declination were South, then were the amplitude southerly.

The Declination and amplitude of the Sunne giuen, to finde the height of the Pole.

Prop. 4.

As the Sine of the amplitude is in proportion to the Sine of the Declination, so is the whole sine to the sine of the Complement of the Latitude.

Example.

The Declination 11. degrées 43. minutes, and the amplitude 19. degrées 7. minutes. I demaund the height of the Pole: say,

If	19.7.	giue	11.43	what	90.
	3275		2031.		10000.

Facit, 6202. whose arch in the Table of sines being 38. deg. 20. minutes, is the height of the Equinoctiall, or the Complement of the Latitude: that subtracted from 90. degrées, leaues 51. degrées 40. minutes for the height of the Pole or Latitude of the place desired.

The true place and Declination of the Sunne giuen, to finde the right ascention.

Prop. 5.

As the sine of the Complement of the Declination is to the totall sine, so is the sine of the complement of the Sunnes distance from the beginning of Aries, to the complement of the right ascention.

Example.

I desire the right ascention of the Sun the 20. of Aprill, 1617. being then in 10. degrées of Taurus, at which time his Declination is 14. degrées 51. minutes, and the complement thereof 75. degrées 9. minutes, and the distance from the beginning of Aries 40 degrées, whose complement is 50. degrées. I say then,

If	75.9.	giue	90	whe	50. degrées.
	9667		10000		7660.

Facit,

Facit. 7923. whose arch in the Tables of ſines is 52. degrées 24. minutes, the complement whereof 37. degrées 36. minutes, is the Sunnes right aſcention: the ſame conuerted into houres by alloweing 15. deg. to an houre, gines two houres and 38. minutes.

This is to be vnderſtood, when the Sunne is betwixt the beginning of Aries, and the Tropicke of Cancer, for if the Sunne be in the tropicke of Cancer, then is the right aſcention 90. degrées or 6. houres: and if the Sunne be betwixt the tropicke of Cancer, and the Equinoctiall point of Libra, ſubſtract the diſtance that the Sun is from the beginning of Aries, out of 180. degrées and with the remainer worke as before for the right aſcention, which aſcention ſo found, take from 180. and the remaine is the right aſcention deſired. But if the Sunne be betwixt the Equinoctiall of Libra, and the tropicke of Capricorne, ſubſtract the ſaid diſtance from the beginning of Aries, out of 270. degrées, and if betwixt the tropicke of Capricorne, and the beginning of Aries, take the ſaid diſtance out of 360. degrées, and then worke as before: One example or two will make all this plaine vnto you.

The laſt of June 1618. the true place of the Sunne 17. degrées 46. minutes of Cancer, is 107. degrées 46. minutes from the beginning of Aries, which taken from 180. leaues 72. degrées 14. minutes, whoſe complement is 17. degrées 46. minutes, the Sunnes declination, then is 22. degrées 19. minutes, the complement thereof 67. degrées 41. minutes. Say then,

If 67.41 giue 90 what 17.46.minutes?
9251 10000 3051.

Facit. 3298. whoſe arch is 19. degrées, 15. min. the complement whereof 70. deg. 45. min. taken from 180. leaues 109. deg. 15. min. for the right aſcention deſired, which conuerted into hour. makes 7. houres 17. minutes. Againe, I deſire the right aſcention of 20. deg. 40. min. of Capricornus whoſe diſtance in continuall proceeding from the beginning of Aries, being 290. degrées 40. minutes taken from 360. leaues 69 degrées 20. minutes, with the complement whereof 20. degrées 40. minutes, and the complement of the Declination of the Sunne vpon the ſame point of the Sunnes place 68. degrées 6. minutes, I worke as followeth.

If

If	68. 6.	giue	90	what	20.40:
	9278		10000.		3529.

Facit 3803. whose arch is 22. degrées 21. minutes, the complement whereof 67. degrées 39. minutes taken from 360. leaues 292. degrées 21. minutes for the right ascention desired, the same conuerted into houres is 19. houres 29. minutes.

The Latitude and Declination of the Sunne knowne, to finde the difference ascentionall.

Prop. 6.

As the sine of the complement of the Latitude is to the sine of the Latitude, so is the sine of the declination to the quotient found: againe as the of the complement of the declination is to the whole sine, so is the said quotient found to the difference ascentionall.

Examples.

I would know the difference ascentionall the 10. of May 1620 the Declination being then 20. degrées, 6. minutes, and the Latitude 51. degrées 40. minutes. I say,

If	38.20.	giue	51.40.	what	20. 6.
	6202.		7844.		3437.

Facit 4346. for the quotient found: then againe I say,

If	69.54	giue	90.	what	
	:9391.		10000		4346.

Facit. 4627. whose arch in the table of sines, 27 degrées 34. minutes is the difference ascentionall for the day proposed: the same reduced into houres and minutes, makes one houre and 50. minutes, which taken from 6. a clock, the houre that the Sunne riseth being in the Equinoctiall, leaueth fours houres 10. minuts

at

at what time the Sunne then riſeth, and the ſaide aſcentionall difference added to 6. a clocke, makes 7. a clocke, 50. minutes, for the Sunne ſetting.

Againe, the ſaide aſcentionall difference doubled and added to twelue houres, the time from 6. in the morning till 6. at night makes 15. houres 40 minutes for the whole length of the day.

This is when the Sunne hath North declination, for if the declination be South, then the aſcentionall difference added to fiue a clocke, gines the Sunnes riſing, and taken from 6. leaues the ſetting, and being doubled and taken from twelue houres, leaues the length of the day as aforeſaid.

The Amplitude and difference aſcentionall of the Sunne or Starres giuen, to finde the Declination.

Prop. 7.

As the ſine of the time of the Sunne riſing, conuerted into degrées and minutes, is to the ſine of the complement of the amplitude, ſo is the whole ſine to the ſine of the complement of the Declination.

Example.

The difference aſcentionall being 27. degrées 34. minutes, ſhewes the Sunne to riſe at 4. a clocke 10. minutes, which conuerted into degrées makes 62. degrées 30. minutes, and the amplitude being found as before is ſhewed in the third Propoſition, is 33. degrées 38. minutes, and the complement thereof 56. degrées 22. minutes. Say then.

If	62.30	gines	56.22	what 90.
	8870.		8326.	10000.

Facit. 9386. whole arch 69. degrées 50. minutes, the complement thereof 20. degrées 10. minutes, is the declination deſired.

The

The Latitude and Declination giuen, to finde the Meridionall altitude.

Prop. 8.

IF the Sunne haue north Declination, adde the complement of the Latitude with the Declination, the product is the Meridionall altitude.

Example.

If the Declination be 23. degrees 30. minutes, and the Latitude 51 degrees 40. minutes, the Complement thereof 38. degrees 20. added with 23. 30. minutes, maketh 61. degrees, 50. minutes, for the Meridian altitude: but if the declination be 23. degrees 30. South, and the Latitude 51. degrees 40. minutes, substract 23. degrees 30. minuts, the Declination from 38. degrees 20. minuts, the complement of the Latitude, and the remainer 14. degrees 50. minutes is the altitude desired: and if the Sunne be in the Equinoctiall, hauing no Declination, then is the Meridian altitude equall to the complement of the Latitude.

The Latitude and Declination knowne, to finde the height of the Sunne at any houre of the day.

Prop. 9.

FIrst you are to consider whether the Sunne be in the Equinoctiall or whether he hath North or South declination, for if the Sunne be in the Equinoctiall, then as the whole sine is to the sine of the complement of the Latitude, so is the sine of the complement of the Sunnes distance from none, allowing 15. degrees for euery houre to the sine of the altitude desired.

Example.

The 10. of March 1616. the Sunne then hauing no Declination, the Latitude 51. degrees 40. minutes, I desire the Sunnes height at 9. a clocke before none, or at three after none, the complement of the Latitude is 38. degrees 20. minuts, and the houres distance from none, 45. degrees, whose complement is also 45. degrees. Say then,

If

If 90. gine 38.20 what 45.
10000. 6202 7071.

Facit. 4385. whose arch 26. deg. is the height of the Sunne aboue the Horizon, the time and place proposed.

If the Sunne haue declination, then is the working some what more tedious, except onely at 6. a cloche, either before or after noone, for which houre, as the whole sine is to the sine of the Latitude, so is the sine of the Declination, to the sine of the Altitude.

Example.

The 10. of Aprill, 1616. the Latitude 51. degrées 40. minutes and the Declination 11. degrées 43. minutes. Say

If 90. gine 51.40 what 11.43
10000. 7844 2031.

Facit. 1592. whose arch 9. deg. 10. min. is the Altitude desired.

But for any other houre of the day if it be lesse then 6. houres, or 90. degrées, worke as followes, multiply the sine of the houres distance from noone by the sine of the complement of the Latitude, the Product deuide by the whole sine, and the arch of the quotient taken from 90. set apart for the number first found, which number so found, compare with the Latitude, then multiply the whole sine, by the sine of the lesser, and deuide the Product thereof by the sine of the greater: and to the complement of the arch of the Product adde the declination of the Sunne, if the Declination be Northerly, or subtract if the Declination be Southerly, and if the Product or remaine be more then 90. degrées take it from 180. and the rest is the second found number, which two numbers so knowne.

As the whole sine is to the number first found, so is the second found number to the Altitude desired.

Example.

The 10 of Aprill at 9. a clocke, the Latitude 51. degrées 40. minutes the distance from noone 45. degrées, and the Declination 11. deg. 43. minutes, I desire the Sunnes height. Say,

If 90. gine 38.20. what 45.
10000. 6202. 7071.

Facit. 4385. whose arch 26. deg. taken from 90. leaues 64. deg.

for

for the first found number, then comparing the Latitude, and it together, the Latitude being the lesser, I multiply the whole sine by the sine thereof, and deuide by the sine of the first found, saying,

If 640 gius 51.40 what 90.
8988 7844 10000.

Facit, 8727. whose arch being 60. deg. 46. min. to the complement thereof 29. deg. 14. min. I adde the declination 11. deg. 43. min. and the totall 40. deg. 57. min. is the second found number, which two numbers so knowne, say againe

If 90. gius 64. 0 what 40.57.
10000 8988 6554.

Facit, 5890. whose arch 36. deg. 5. minutes is the Altitude of the Sunne desired.

Againe, if the houre for which you desire the Sunnes height, be more then 6. houres or 90. degrées from the Meridian, you must subtract the said distance from 180. and multiply the sine of the remainer, by the sine of the complement of the Latitude, which product being deuided by the whole sine, the complement of the quotients arch is the first found number, the sine whereof compare with the sine of the Latitude, multiplying the whole sine by the lesser, and deuiding the product by the greater: from the arch of which quotient, if you take the complement of the Declination, you haue the second found number, the sine whereof multiplyed by the sine of the first found, and the product deuided by the totall sine, the quotients arch is the Altitude desired.

Example.

The 10. of Aprill at 5. in the morning, the Latitude 51. deg. 40 min. the houres distance from none 7. or 105. deg. which deducted from 180. leaues 75. deg. for the houre distance. Say then,

If 90 gius 38.20 what 75.0.
10000 6202 9659.

Facit, 5990. whole arch being 36. deg. 48. min. the complement thereof 53. 12. is the first found number: Say then againe,

If 53.12 gius 51.40 what 90.
8007 7844 10000.

Facit. 9796. from whole arch 78. deg. 25. min. taking 78. deg. 17. min.

17. min. the complement of the Sunnes declination, refts 8. min. for the second fourth number, which 2. numbers is added. Say,

If	90.	gins	53.12	what	08.
	10000		8007		023.

Facit, 18. whose arch 6. min. is the height of the Sunne aboue the Horizon at 5. in the morning, or 7. in the euening, the day and time aforesaid.

The Latitude giuen, to finde how many minutes or miles of the Equinoctiall, make a degree of Longitude in any Paralell. Prop. 10.

As the whole sine is in proportion to 60. so is the sine of the complement of the Latitude, to the miles answerable to a degree in the Latitude desired.

I desire to know how many miles in running East or West in the Latitude of 51. deg. 40. min. will alter one deg. of Long: Say

If	90	giue	60	what	38.20.
	10000				6202.

Facit, 37. for the number of miles, answerable to a deg. in the Latitude desired.

The course and distance giuen, to finde out the difference of Latitude. Prop. 11.

As the whole sine is to the miles of way run, so is the sine of the courses dist. from east or west to the min. of difference of Latitude. Example.

Running west southwest, which is 22. deg. 30. min. from the west 75. leagues or 225. miles, I demaund the difference of Latitude? Say,

If	90	gins	225	what	22.30.
	10000				3827.

Facit, 86. min. or one deg. 26. min. for the difference of Latitude vpon the said course and distance.

By course and distance giuen, to finde the difference of Longitude. Prop. 12.

As the whole sine is to the miles of way that you haue runne so is the sine of the deg. that your course is distant from south or north to the miles that you are departed from your first Merid.

Example.

25-42-51

Example.

Running Northweſt and by North which is 33. deg. 45. min from the North 60. leagues or 180. miles, I demaund the difference of Longitude & Way,

If 90. giue 180. what 33.45.
10000. 5556.

Facit, 100 miles which you are departed from the Meridian to the weſtward, which if you deuide by the number of miles anſwerable to a deg. of Longitude, in the Latitude where you then finde your ſelfe to be, the quotient giues you the deg. and min. of the difference of Longitude.

By the diſtance, and departure from the Meridian giuen to finde the courſe. Prop. 13.

As the miles of diſtance that you haue runne, is in proportion to the whole ſine, ſo is the miles of your departure from the Meridian to the ſine of your courſe from South or North.

Example.

Being departed from the firſt Meridian 75. miles in the running of 50. leagues, or a 150. miles, I demaund vpon what point I haue ſayled, it being betwixt South and weſt & Way.

If 150. giue 10000. what 75.

Facit, 5000. whoſe arch 30. degrees is the diſtance from ſouth towards weſt that the courſe is, which is ſouthweſt and by ſouth ſoutherly.

The Latitude, Declination, and height of the Sunne giuen, to know the houre of the day.

Prop. 14.

Adde the complement of the Latitude, and the Declination together, and from the ſine of the totall, ſubſtract the ſine of the Altitude obſerued, the remainer is your number firſt found, which number firſt found, multiply by the whole ſine, and deuide by the ſine of the complement of the Latitude, the quotient whereof is the ſecond found number, which ſecond number ſo knowne, as the ſine of the complement of the Declination is to the totall ſine, ſo is the ſaid ſecond found number to the quotient, which quotient taken from the whole ſine, the complement of the arch

arch to the remainer, is the Sunnes distance from noone in degrées and minutes.

Example.

The 15. of May the declination 21. degrées 4. minutes, and the complement of the Latitude 38. degr. 20. min. added together, is 59. degrées 24. minutes, the line thereof 8607. the height of the Sunne observed 48. degr 30. minutes, the line thereof 7490. the which taken from the former number, leaues 1117. for the first found number: then I say,

If 38. 20 giue 90 what
6202 10000 1117

Facit 1801 for the second found number. Againe say,

If 68. 56 giue 90 what
9332 10000 1801

Facit 1929. which taken from 10000 leaues 8071. whose arch 53. degrees 49. minutes subtracted from 90. leaues 36 degrees 11. minutes, for the Sunnes distance from the Meridian: that conuerted into houres, is 2. houres 24. minutes from noone, when the Sunne is so high as aforesaid.

To finde the *Sinus versus* of any giuen arch.

Prop. 15.

IF the arch giuen, be lesse then 90. subtract it from 90. and the line of the remainer taken from the totall line, leaues the Sinus-versus, but if the giuen arch be greater then 90. deg. subtract 90. degrées there from, and seeke the line of the remainer, which is alwayes the complement of the giuen arch: which Sinus adde to the whole line, and the totall thereof is the Sinus versus of the giuen arch desired.

Example.

To knowe the Sinus versus of 47. deg. 12. min. the complement thereof is 42. deg. 48. min. whose line 6794. taken from 10000. the whole line resteth 3206. the reuersed line of 47. deg. 12. min.

Likewise, to knowe the reuersed line of 137. degrées 25. min. which is more then 90. deg. taking 90. there from, there resteth 47. degrées 25. minutes, the Sinus whereof 7363. added to the whole line, maketh 17363. for the reuersed line of 137. degrées 25. minutes.

A Table

The Degrees of the Quadrant.

m	0	1	2	3	4	5	6	7	8	9
1	3	177	352	526	700	874	1048	1222	1395	1567
2	6	180	355	529	703	877	1051	1224	1398	1570
3	9	183	353	532	706	880	1054	1227	1400	157;
4	12	186	361	535	709	883	1057	1230	1403	1576
5	14	188	362	538	712	886	1060	1233	1406	1579
6	17	192	36	541	715	889	1063	1236	1409	1582
7	20	195	369	544	718	892	1065	1239	1412	1584
8	23	198	372	547	721	895	1068	1242	1415	1587
9	26	201	375	549	724	898	1071	1245	1418	1590
10	29	204	378	552	727	900	1074	1247	1421	1593
11	32	206	381	555	729	903	1077	1250	1424	1596
12	35	209	384	558	732	906	1080	1253	1426	1599
13	38	212	387	561	735	909	1083	1256	1429	1602
14	41	215	390	564	738	912	1086	1259	1432	1605
15	44	218	393	567	741	915	1089	1262	1435	1608
16	46	221	395	570	744	918	1091	1265	1438	1610
17	49	224	398	573	747	921	1097	1268	1441	1613
18	52	227	401	576	750	924	1094	1271	1444	1616
19	55	230	404	578	753	927	1100	1273	1446	1619
20	58	233	407	581	756	930	1103	1276	1449	1622
21	61	235	410	584	758	932	1106	1279	1452	1625
22	64	238	413	587	761	935	1109	1282	1455	1627
23	67	241	416	590	764	938	1112	1285	1458	1630
24	70	244	419	593	767	941	1115	1288	1451	1633
25	73	247	422	596	770	944	1118	1291	1464	1636
26	76	250	425	599	773	947	1120	1294	1467	1639
27	78	253	427	602	776	950	1123	1297	1469	1642
28	81	256	430	605	779	953	1126	1299	1472	1645
29	84	259	433	608	782	956	1129	1302	1475	1648
30	87	262	436	610	785	959	1132	1305	1478	1650

The Degrees of the Quadrant.

mi	0	1	2	3	4	5	6	7	8	9
31	92	265	439	613	787	961	1135	1308	1481	1653
32	93	268	442	616	790	964	1138	1311	1484	1656
33	96	270	445	619	793	967	1141	1314	1487	1659
34	99	273	448	622	796	970	1144	1317	1490	1662
35	102	276	451	625	799	973	1146	1320	1492	1665
36	105	279	454	628	802	976	1149	1322	1495	1668
37	107	282	456	631	805	979	1152	1325	1498	1670
38	110	285	459	634	808	982	1155	1328	1501	1673
39	113	288	462	637	811	985	1158	1331	1504	1676
40	116	291	465	640	814	987	1161	1334	1507	1679
41	119	294	468	642	816	990	1164	1337	1510	1682
42	122	297	471	645	819	993	1167	1340	1513	1685
43	125	300	474	648	822	996	1170	1343	1515	1688
44	128	302	477	651	825	999	1172	1346	1518	1691
45	131	305	480	654	828	1002	1175	1348	1521	1693
46	134	308	483	657	831	1005	1178	1351	1524	1696
47	137	311	485	660	834	1008	1181	1354	1527	1699
48	140	314	488	663	837	1011	1184	1357	1530	1702
49	142	317	491	666	840	1013	1187	1360	1533	1705
50	145	320	494	668	843	1016	1190	1363	1536	1708
51	148	323	497	671	845	1019	1193	1366	1538	1711
52	151	326	500	674	848	1022	1196	1369	1541	1714
53	154	329	503	677	851	1025	1198	1372	1544	1716
54	157	331	506	680	854	1028	1201	1374	1547	1719
55	160	334	509	683	857	1031	1204	1377	1550	1722
56	163	337	512	686	860	1034	1207	1380	1553	1725
57	166	340	515	689	863	1037	1210	1382	1556	1728
58	169	343	517	692	866	1039	1213	1386	1559	1731
59	172	347	520	695	869	1042	1216	1389	1561	1734
60	174	350	523	697	871	1045	1219	1392	1564	1736

A Table

The Degrees of the Quadrant.

m.	10	11	12	13	14	15	16	17	18	19
1	1739	1911	2082	2252	2422	2591	2759	2926	3093	3258
2	1742	1914	2035	2255	2425	2594	2752	2929	3096	3261
3	1745	1917	2038	2258	1423	2597	2765	2932	3098	3264
4	1747	1919	2090	2261	2430	2599	2767	2935	3101	3267
5	1750	1922	2093	2264	2433	2602	2770	2938	3104	3269
6	1753	1925	2096	2267	2435	2605	2773	2940	3107	3272
7	1756	1928	2099	2269	2439	2608	2776	2943	3109	3275
8	1759	1931	2102	2272	2442	2611	2779	2946	3112	3278
9	1762	1934	2105	2275	2445	2613	2781	2949	3115	3280
10	1765	1937	2107	2273	2447	2616	2784	2951	3118	3283
11	1767	1939	2110	2281	2450	2619	2787	2954	3120	3286
12	1770	1942	2113	2283	2453	2622	2790	2957	3123	3289
13	1773	1945	2117	2286	2456	2625	2793	2960	3126	3291
14	1776	1948	2119	2289	2459	2628	2795	2963	3129	3294
15	1779	1951	2122	2291	2462	2630	2798	2965	3132	3297
16	1782	1954	2125	2295	2464	2633	2801	2968	3134	3300
17	1785	1957	2127	2293	2467	2636	2804	2971	3137	3302
18	1788	1959	2130	2300	2470	2639	2807	2974	3140	3305
19	1790	1962	2133	2303	2473	2641	2809	2976	3143	3308
20	1793	1965	2136	2306	2476	2644	2812	2979	3146	3311
21	1796	1968	2139	2309	2478	2647	2815	2982	3148	3313
22	1799	1971	2142	2312	2481	2650	2818	2985	3151	3316
23	1802	1974	2145	2315	2484	2653	2821	2988	3154	3319
24	1805	1977	2147	2317	2487	2655	2823	2990	3156	3322
25	1808	1979	2150	2320	2490	2658	2826	2993	3159	3324
26	1810	1982	2153	2323	2492	2661	2829	2996	3162	3327
27	1813	1985	2156	2326	2495	2664	2832	2999	3165	3330
28	1816	1988	2159	2329	2498	2667	2835	3001	3167	3332
29	1819	1991	2161	2331	2501	2669	2837	3004	3170	3335
30	1822	1994	2164	2334	2504	2672	2840	3007	3173	3338

The Degrees of the Quadrant.

mi	10	11	12	13	14	15	16	17	18	19
31	1825	1996	2167	2337	2507	2675	2843	3010	3176	3341
32	1828	1999	2170	2340	2509	2678	2846	3013	3178	3343
33	1830	2002	2173	2343	2512	2681	2848	3015	3181	3346
34	1833	2005	2176	2346	2515	2683	2851	3018	4184	3349
35	1836	2008	2178	2349	2518	2686	2854	3021	3187	3352
36	1839	2011	2181	2351	2521	2689	2857	3024	3189	3354
37	1842	2014	2184	2354	2524	2692	2860	3026	3192	3357
38	1845	2016	2187	2357	2526	2695	2862	3029	3195	3360
39	1848	2019	2190	2360	2529	2698	2865	3032	3198	3363
40	1850	2022	2193	2363	2532	2700	2868	3035	3201	3365
41	1853	2025	2196	2365	2535	2703	2871	3037	3203	3368
42	1856	2028	2198	2368	2538	2706	2874	3040	3206	3371
43	1859	2031	2201	2371	2540	2709	2876	3043	3209	3374
44	1862	2034	2204	2374	2543	2712	2879	3046	3212	3376
45	1865	2036	2207	2377	2546	2714	2882	3049	3214	3379
46	1868	2039	2210	2380	2549	2717	2885	3051	3217	3382
47	1870	2042	2213	2382	2552	2720	2887	3054	3220	3385
48	1873	2045	2216	2385	2555	2723	2890	3057	3223	3387
49	1876	2048	2218	2388	2557	2726	2893	3060	3225	3390
50	1879	2051	2221	2391	2560	2728	2896	3062	3228	3393
51	1882	2053	2224	2394	2563	2731	2899	3065	3231	3396
52	1885	2056	2227	2397	2566	2734	2901	3068	3234	3398
53	1888	2059	2230	2399	2568	2737	2904	3071	3236	3401
54	1891	2062	2231	2402	2571	2740	290-	3073	3239	3404
55	1894	2065	2235	2405	2574	2742	291-	3076	3242	3406
56	1896	2068	2238	2409	2577	2745	291-	3079	3245	3409
57	1899	2070	2241	2411	2580	2748	2915	3082	3247	3412
58	1902	2073	224-	2414	2583	2751	2918	3085	3250	3415
59	1905	2076	22.7	2416	2585	2754	2921	3087	3253	3417
60	1908	2079	2249	2419	2588	2756	2924	3090	3256	3420

A Table

The Degrees of the Quadrant.

min	20	21	22	23	24	25	26	27	28	29
1	3423	3586	3749	3910	4070	4229	4386	4542	4597	4851
2	3429	3589	3751	3913	4073	4231	4389	4545	4700	4853
3	3428	3592	3754	3915	4075	4234	4391	4548	4702	4856
4	3431	3594	3757	3918	4078	4237	4394	4550	4705	4858
5	3434	3597	3759	3921	4081	4239	4396	4553	4707	4861
6	3437	3600	3761	3923	4083	4242	4399	4555	4710	4863
7	3439	3603	3765	3926	4086	4245	4402	4558	4713	4866
8	3442	3605	3768	3929	4089	4247	4404	4561	4715	4868
9	3445	3608	3770	3931	4091	4250	4407	4563	4718	4871
10	3447	3611	3773	3934	4094	4252	4410	4566	4720	4873
11	3450	3613	3776	3937	4096	4255	4412	4568	4723	4876
12	3453	3616	3778	3939	4099	4258	4415	4571	4725	4878
13	3456	3619	3781	3942	4102	4260	4418	4573	4728	4881
14	3458	3622	3784	3945	4104	4263	4420	4576	4731	4883
15	3461	3624	3786	3947	4107	4266	4423	4579	4733	4886
16	3464	3627	3789	3950	4110	4268	4425	4581	4736	4888
17	3467	3630	3792	3953	4112	4271	4428	4584	4738	4891
18	3469	3632	3794	3955	4115	4274	4431	4586	4741	4893
19	3472	3635	3797	3958	4118	4276	4433	4589	4743	4896
20	3475	3638	3800	3961	4120	4279	4436	4592	4746	4898
21	3477	3641	3803	3963	4123	4281	4438	4594	4748	4901
22	3480	3643	3805	3966	4126	4284	4441	4597	4751	4904
23	3483	3646	3808	3969	4128	4287	4444	4599	4754	4906
24	3486	3649	3811	3971	4131	4289	4446	4602	4756	4909
25	3488	3651	3813	3974	4134	5292	4449	4604	4759	4911
26	3491	3654	3816	3977	4136	4295	4451	4607	4761	4914
27	3494	3657	3819	3979	4139	4297	4454	4610	4764	4916
28	3497	3660	3821	3982	4142	4300	4457	4612	4766	4919
29	3499	3662	3824	3985	4144	4302	4459	4515	4769	4921
30	3502	3665	3827	3987	4147	4305	4462	4617	4771	4924

The Degrees of the Quadrant.

mi	20	21	22	23	24	25	26	27	28	29
31	3505	3668	3829	3990	4149	4308	4464	4620	4774	4927
32	3507	3670	3832	3993	4152	4310	4467	4623	4777	4929
33	3510	3673	3835	3995	4155	4313	4470	4625	4779	4932
34	3513	3676	3837	3998	4157	4316	4472	4628	4782	4934
35	3516	3679	3840	4001	4160	4318	4475	4630	4784	4937
36	3518	3681	3843	4003	4163	4321	4478	4633	4787	4939
37	3521	3684	3845	4006	4165	4324	4480	4635	4789	4942
38	3524	3687	3848	4009	4168	4326	4483	4638	4792	4944
39	3527	3689	3851	4011	4171	4329	4485	4641	4794	4947
40	3529	3692	3854	4014	4173	4331	4488	4643	4797	4949
41	3532	3695	3856	4017	4176	4334	4490	4646	4799	4952
42	3535	3697	3859	4019	4178	4336	4493	4648	4802	4954
43	3537	3700	3862	4022	4181	4338	4496	4651	4805	4957
44	3540	2703	3864	4025	4184	4342	4498	4653	4807	4960
45	3543	3706	3867	4028	4186	4344	4501	4656	4810	4962
46	3546	3708	3870	4030	4189	4347	4503	4659	4812	4965
47	3548	3711	3872	4033	4192	4350	4506	4661	4815	4967
48	3551	3714	3875	4035	4194	4352	4509	4664	4817	4970
49	3554	3716	3878	4038	4197	4355	4511	4666	4820	4972
50	3556	3719	2880	4041	4200	4357	4514	4669	4822	4975
51	3559	3722	3883	4043	4202	4360	4516	4671	4825	4977
52	3562	3724	3886	4046	4205	4363	4519	4674	4828	4980
53	3565	3727	3888	4049	4208	4365	4522	4677	4830	4982
54	3567	3730	3891	4051	4210	4368	4524	4679	4833	4985
55	3570	3732	3894	4054	4213	4371	4527	4682	4835	4987
56	3573	3735	3896	4057	4216	4373	4529	4684	4838	4990
57	3575	3738	3899	4059	4218	4376	4532	4687	4840	4992
58	3578	3741	3902	4062	4221	4378	4535	4689	4843	4995
59	3581	3743	3905	4065	4224	4381	4537	4692	4845	4997
60	3584	3746	3908	4067	4226	4384	4540	4695	4848	5000

A Table

The Degrees of the Quadrant.

min	30	31	32	33	34	35	36	37
1	5002	5153	5302	5449	5594	5738	5880	6020
2	5005	5155	5304	5451	5597	5740	5882	6023
3	5007	5158	5306	5454	5599	5743	5885	6025
4	3010	5160	5309	5456	5601	5745	5887	6027
5	3012	516;	5311	5458	5604	5748	5890	6030
6	3015	5165	5314	5461	5606	5750	5892	6032
7	5017	5168	5316	5463	5609	5752	5894	6034
8	5020	5170	5319	5466	5611	5755	5896	6037
9	5022	5173	5321	5468	5614	5757	5899	6039
10	5025	5175	5324	5471	5616	5759	5901	6041
11	5027	5178	5326	5473	5618	5762	5904	6044
12	5030	5180	5329	5476	5621	5761	5906	6046
13	5032	5183	5331	5478	5623	5767	5909	6048
14	5035	5185	5334	5480	5625	5769	3911	6051
15	5037	5188	5336	5483	5628	5771	5913	6053
16	5040	5190	5339	5485	5630	5774	5915	6055
17	5042	5193	5341	5488	5633	5776	5918	6057
18	5045	5195	5343	5490	5635	5773	5920	6060
19	5048	5198	5346	5493	5638	5781	5922	6062
20	5050	5200	5348	5495	5640	5733	5925	6064
21	5053	5203	5351	5497	5642	5785	5927	6067
22	5055	5205	5353	5500	5645	5788	5929	6069
23	5058	5208	5356	5502	5647	5790	5932	6071
24	5060	5210	5358	5505	5650	5793	5934	6074
25	5063	5212	5361	5507	5652	5795	5936	6075
26	5065	5215	5363	5509	5654	5797	5939	6078
27	5068	5217	5366	5512	5657	5800	5941	6031
28	5070	5220	5368	5514	5659	5802	5943	6083
29	5073	5222	5370	5517	5662	5805	5946	6085
30	5075	5225	5373	5519	5664	5807	5948	6088

The degrees of the Quadrant.

mi	30	31	32	33	34	35	36	37
31	5078	5227	5375	5522	5666	5809	5950	6090
32	5080	5230	5378	5524	5669	5812	5953	6093
33	5083	5232	5380	5527	5671	5814	5955	6094
34	5085	5235	5383	5529	5674	5816	5957	6097
35	5088	5237	5385	5531	5676	5819	5960	6099
36	5090	5240	5388	5534	5678	5821	5962	6101
37	5093	5242	5390	6536	5631	5823	5964	6104
38	5095	5245	5393	5539	5683	5826	5967	6106
39	5098	5247	5395	5541	5685	5828	5969	6108
40	5100	5250	5397	5543	5688	5831	5971	6111
41	5103	5242	5400	5545	5690	5833	5974	6113
42	5105	5255	5402	5548	5693	5835	5976	6115
43	5108	5257	5404	5551	5695	5838	5978	6117
44	5110	5260	5407	5553	5697	5840	5981	6120
45	5113	5262	5410	5556	5700	5842	5983	6122
46	5115	5265	5412	5558	5702	5845	5985	6124
47	5118	5267	5415	5560	5705	5847	5988	6127
48	5120	5269	5417	5563	5707	5849	5990	6129
49	5123	5272	5419	5565	5709	5852	5992	6131
50	5127	5274	5422	5568	5712	5854	5995	6134
51	5128	5277	5424	5570	5714	5856	5997	6136
52	5130	5279	5427	5573	5717	5859	5999	6138
53	5133	5282	5429	5575	5719	5861	6002	5140
54	5135	5284	5432	5577	5721	5864	6004	6143
55	5138	5287	5434	5580	5724	5866	6006	6145
56	5140	5289	5437	5582	5726	5868	6009	6147
57	5142	5292	5439	5585	5729	5871	6011	6149
58	5145	5294	5441	5587	5731	5873	6013	6152
59	5148	5297	5444	5589	5733	5875	6016	6154
6	5150	5299	5446	5592	5736	5878	6018	6156

The Degrees of the Quadrant.

min	38	39	40	41	42	43	44	45
1	6159	6295	6430	6563	6694	6822	6949	7073
2	6161	6298	6432	6565	6696	6824	6951	7075
3	6163	6300	6434	6567	6698	6826	6953	7077
4	6166	6302	6437	6569	6700	6828	6955	7079
5	6168	6304	6439	6571	6702	6831	6957	7081
6	6170	6307	6441	6574	6704	6833	6959	7083
7	6173	6309	6443	6576	9706	6835	6961	7085
8	6175	6311	6446	6578	6708	6837	6963	7087
9	6177	6313	6448	6580	6711	6839	6965	7089
10	6179	6316	6450	6583	6713	6841	6967	7092
11	6182	6318	6452	6585	6715	6843	6969	7094
12	6184	6320	6454	6587	6717	6845	6972	7096
13	6186	6322	6457	6589	6719	6848	6974	7098
14	6189	6325	6459	6591	6721	6850	6976	7100
15	6191	6327	6461	6593	6724	6852	6978	7102
16	6193	6329	6463	6596	6726	6854	6980	7104
17	6195	6331	6466	6598	6728	6856	6982	7106
18	6198	6334	6469	6600	6730	6858	6984	7108
19	6200	6336	6470	6602	6732	6860	6986	7110
20	6202	6338	6472	6604	6734	6862	6988	7112
21	6205	6340	6474	6606	6736	6864	6990	7114
22	6207	6343	6477	6608	6738	6867	6992	7116
23	6209	6345	6479	6611	6741	6869	6994	7118
24	6211	6347	6481	6613	6743	6871	6997	7120
25	6213	6349	6483	6615	6745	6874	6999	7122
26	6216	6352	6486	6617	6747	6875	7001	7124
27	6218	6354	6488	6620	6749	6877	7004	7126
28	6220	6356	6490	6622	6752	6879	7005	7128
29	6223	6358	6492	6624	6754	6881	7007	7130
30	6225	6361	6494	6626	6756	6883	7009	7132

Of the Sines.

The degrees of the Quadrant.

mi	38	39	40	41	42	43	44	45
31	6227	6363	6497	6628	6758	6886	7011	7134
32	6230	6365	6499	6630	6760	6888	7013	7136
33	6232	6367	6501	6633	6762	6890	7015	7139
34	6234	6370	6503	6635	6764	6892	7017	7141
35	6236	6372	6505	6637	6766	6894	7019	7143
36	6239	6374	6508	6639	6769	6896	7021	7145
37	6241	6376	6510	6641	6771	6898	7023	7147
38	6243	6379	6512	6644	6773	6900	7026	7149
39	6245	6381	6514	6646	6775	6902	7028	7151
40	6248	6383	6516	6648	6777	6905	7030	7153
41	6250	6385	6519	6650	6779	6907	7032	7155
42	6252	6387	6521	6652	6781	6909	7034	7157
43	6255	6390	6523	6654	6783	6911	7036	7159
44	6257	6392	6525	6657	6786	6913	7038	7161
45	6259	6394	6527	6659	6788	6915	7040	7163
46	6261	6396	6530	6661	6790	6917	7042	7165
47	6264	6399	6532	6663	6792	6919	7044	7167
48	6266	6401	6534	6665	6794	6921	7045	7169
49	6268	6403	6536	6667	6796	6923	7048	7171
50	6270	6405	6539	6670	6799	6925	7050	7173
51	6273	6408	6541	6672	6801	6928	7052	7175
52	6275	6410	6543	6674	6803	6930	7054	7177
53	6277	6412	6545	6676	6805	6932	7057	7179
54	6279	6414	6547	6678	6807	6934	7059	7181
55	6282	6417	6550	6680	6809	6936	7061	7183
56	6284	6419	6552	6683	6811	6938	7063	7185
57	6285	6421	6554	6685	6813	6940	7065	7187
58	6289	6423	6556	6687	6816	6942	7067	7189
59	6291	6426	6558	6689	6818	6944	7069	7191
60	6293	6428	6560	6691	6820	6946	7071	7193

A Table

The Degrees of the Quadrant.

mi	46	47	48	49	50	51	52	53
1	7195	7315	7433	7549	7662	1773	7882	7988
2	7197	7317	7435	7551	766.	775	7884	7990
3	7199	7319	7437	7553	7696	7777	7885	7992
4	7201	7321	7439	7555	7668	7780	7887	7993
5	7203	7323	7441	7557	767c	7781	7889	7995
6	7205	7325	7443	7559	7672	7782	7891	7997
7	7207	7327	7445	7560	7673	7784	7893	7998
8	7209	7329	7447	7562	7675	7786	7894	8000
9	7211	7331	7449	7564	7677	7788	7896	8002
10	7213	7333	7451	7566	7679	7790	7898	8004
11	7215	7335	7453	7568	7681	7791	7900	8005
12	7218	7337	7455	7570	7683	7793	7901	8007
13	7220	4339	7457	7572	7685	7795	7903	8009
14	7222	7341	7459	7574	7687	7797	7905	8011
15	7224	7343	7461	7576	7688	7799	7907	8012
16	7226	7345	7463	7577	7690	7801	7909	8014
17	7228	7347	7464	7579	7692	7803	7910	8016
18	7230	7349	7466	7581	7694	7804	7912	8018
19	7232	7351	7468	7583	7696	7806	7914	8019
20	7234	7353	7470	7585	7698	7808	7916	8021
21	7236	7355	7472	7587	7700	7810	7918	8023
22	7238	7357	7474	7589	7701	78:1	7919	8025
23	7240	7359	7476	7591	7703	7813	7921	80:6
24	7242	7361	7478	7593	7705	7815	7923	8028
25	7244	7363	7480	7595	7707	7807	7925	8030
26	7246	7365	7482	7596	7709	7809	7926	8032
27	7248	7367	7484	7598	7711	7811	7928	8033
28	7250	7369	7486	7600	7712	7822	7930	8035
29	7252	7371	7488	7602	7714	7824	7932	8037
30	7254	7373	7490	7604	7716	78:6	7933	8038

The Degrees of the Quadrant.

m	45	47	48	49	50	51	52	53
31	7256	7375	7491	7606	7718	7828	7935	8040
32	7258	7377	7493	7608	7720	7830	7937	8042
33	7256	7379	7495	7610	7722	7832	7939	8044
34	7262	7381	7497	7612	7724	7833	7941	8045
35	7264	7382	7499	7613	7725	7835	7942	8047
36	7266	7384	7501	7615	7727	7837	7944	8049
37	7268	7385	7503	7617	7729	7839	7945	8051
38	7270	7388	7505	7619	7731	7840	7948	8052
39	7272	7390	7507	7621	7733	7842	7949	8054
40	7274	7392	7509	7623	7735	7844	7951	8056
41	7276	7394	7511	7625	7737	7846	7953	8058
42	7278	7395	7513	7627	7739	7848	7955	8059
43	7280	7398	7514	7629	7740	7849	7956	8061
44	7282	7400	7516	7630	7742	7851	7958	8063
45	7284	7402	7518	7632	7744	7853	7960	8064
46	7286	7404	7520	7634	7746	7855	7962	8066
47	7288	7405	7522	7636	7748	7857	7963	8068
48	7290	7408	7524	7638	7750	7858	7965	8070
49	7292	7410	7525	7640	7751	7860	7967	8071
50	7294	7412	7528	7642	7753	7862	7969	8073
51	7296	7414	7530	7644	7755	7864	7970	8075
52	7298	7415	7532	7645	7757	7866	7972	8076
53	7300	7413	7534	7647	7759	7867	7974	8078
54	7302	7420	7536	7649	7760	7869	7976	8080
55	7304	7422	7537	7651	7762	7871	7977	8082
56	7305	7424	7539	7653	7764	7873	7979	8083
57	7307	7426	7541	7655	7765	7875	7981	8085
58	7309	7428	7543	7657	7767	7877	7983	8087
59	7311	7430	7545	7658	7770	7878	7985	8088
60	7313	7431	7547	7660	7771	7880	7985	8090

A Table

The Degrees of the Quadrant.

mi	54	55	56	57	58	59	60
1	8092	8193	8292	8388	8482	8573	8662
2	8094	8195	8294	8390	8483	8575	8663
3	8095	8197	8295	8391	8485	8576	[illegible]
4	8097	8198	8297	8393	8487	8578	[illegible]
5	8099	8200	8298	8395	8489	8579	8668
6	8100	8201	8200	8396	8490	8581	8669
7	8102	8203	8302	8398	8491	8582	8670
8	8104	8205	8303	8399	8493	8584	8672
9	8105	8206	8305	8401	8494	8585	8673
10	8107	8208	8307	8402	8496	8587	8675
11	8109	8210	8308	8404	8497	8588	8676
12	8111	8212	8310	8406	8499	8590	8678
13	8112	8213	8311	8407	8500	8591	8679
14	8114	8215	8313	8409	8502	8593	8681
15	8116	8216	8315	8410	8503	8594	8682
16	8117	8218	8316	8412	8504	8596	8684
17	8119	8220	8318	8414	8506	8597	8685
18	8121	8221	8319	8415	8507	8599	8687
19	8122	8223	8321	8417	8509	8600	8688
20	8124	8225	8323	8418	8511	8602	8690
21	8126	8226	8324	8420	8513	8603	8691
22	8128	8228	8326	8421	8514	8605	8692
23	8129	8230	8328	8423	8516	8606	8694
24	8131	8231	8329	8424	8517	8607	8695
25	8133	8233	8331	8426	8519	8608	8697
26	8134	8235	8332	8428	8520	8610	8598
27	8136	8236	8334	8429	8522	8612	8699
28	8138	8238	8336	8431	8523	8613	8701
29	8139	8240	8337	8432	8525	8615	8702
30	8141	8241	8339	8434	8526	8616	8704

The degrees of the Quadrant.

mi	54	55	56	57	58	59	60
31	8143	8243	8340	8435	8528	8618	8705
32	8144	8245	8342	8437	8529	8619	8706
33	8146	8246	8344	8438	8531	8621	8708
34	8148	8248	8346	8440	8532	8622	8709
35	8149	8249	8347	8442	8535	8623	8711
36	8151	8251	8348	8443	8536	8627	8712
37	8153	8253	8350	8445	8537	8628	8713
38	8155	8254	8352	8446	8539	8629	8715
39	8156	8256	8353	8448	8540	8630	8716
40	8158	8257	8355	8449	8542	8631	8718
41	8160	8259	8356	8451	8543	8633	8719
42	8161	8261	8358	8452	8545	8634	8721
43	8163	8263	8360	8454	8546	8636	8722
44	8165	8264	8361	8455	8548	8637	8724
45	8166	8266	8363	8457	8549	8638	8725
46	8168	8267	8364	8458	8551	8640	8726
47	8170	8269	8366	8460	8552	8641	8728
48	8171	8271	8367	8462	8554	8643	8729
49	8172	8272	8369	8463	8555	8644	8731
50	8174	8274	8371	8465	8557	8646	8732
51	8176	8276	8372	8466	8558	8647	8733
52	8178	8277	8374	8468	8560	8649	8735
53	8180	8279	8375	8470	8561	8650	8736
54	8181	8281	8377	8471	8563	8653	8738
55	8183	8282	8379	8473	8564	8654	8739
56	8185	8284	8380	8474	8566	8654	8740
57	8186	8285	8382	8476	8567	8656	8742
58	8188	8287	8383	8477	8568	8657	8743
59	8190	8289	8385	8479	8569	8659	8745
60	8191	8290	8387	8480	8570	8660	8746

A Table

The degrees of the Quadrant.

mi	61	62	63	64	65	66	67
2	8749	8832	8913	8990	9065	9138	9207
4	8752	8835	8915	8993	9068	9140	9209
6	8755	8837	8918	8995	9070	9142	9212
8	8758	8841	8921	8998	9073	9145	9214
10	8760	8843	8923	9000	0075	9147	9216
12	8763	8846	8926	9003	9078	9149	9218
14	8766	8849	8928	9006	9080	9152	9221
16	8769	8852	8931	9008	9083	9154	9223
18	8771	8854	8934	9011	9085	9156	9225
20	8774	8857	8936	9013	9087	9159	9228
22	8777	8860	8939	9016	9090	9161	9230
24	8780	8862	8941	9018	9092	9164	9232
26	8783	8865	8644	9021	9095	9166	9234
28	8785	8867	8947	9023	9097	9168	9236
30	8788	8870	8949	9026	9100	9171	9239
32	8791	8873	8952	9028	9102	9173	9241
34	8794	8875	8954	9031	9104	9175	9243
36	8796	8878	8957	9033	9107	9177	9245
38	8799	8880	8960	9036	9109	9180	9247
40	8802	8883	8962	9038	9112	9182	9250
42	8805	8886	8965	9041	9114	9184	9252
44	8808	8889	8967	9043	9116	9187	9254
46	8810	8891	8970	9046	9119	9189	9256
48	8813	8894	8972	9048	9121	9191	9259
50	8816	8897	8975	9051	9123	9194	9261
52	8819	8899	8978	9054	9126	9196	9263
54	8821	8902	8980	9056	9128	9198	9265
56	8824	8905	8983	9058	9131	9200	9267
58	8827	8907	8985	9061	9133	9203	9270
60	8830	8910	8988	9063	9135	9205	9272

The degrees of the Quadrant.

mi	68	69	70	71	72	73	74
2	9274	9338	9399	9457	9512	9565	9614
4	9276	9340	9401	9459	9514	9566	9616
6	9278	9342	9403	9461	9516	9568	9617
8	9280	9344	9405	9463	9518	9570	9619
10	9283	9346	9407	9465	9519	9571	9620
12	9285	9348	9409	9466	9521	9573	9622
14	9287	9351	9411	9468	9523	9575	9624
16	9289	9352	9413	9470	9525	9576	9625
18	9291	9354	9415	9472	9527	9578	9627
20	9293	9356	9417	9474	9528	9580	9628
22	9296	9358	9419	9476	9530	9581	9630
24	9298	9360	9420	9478	9532	9583	9632
26	9300	9363	9422	9480	9534	9585	9633
28	9302	9365	9424	9481	9535	9586	9635
30	9304	9367	9426	9483	9537	9588	9636
32	9306	9369	9428	9485	9539	9590	9638
34	9308	9371	9430	9487	9540	9591	9639
36	9310	9373	9432	9489	9542	9593	9641
38	9313	9375	9434	9491	9544	9595	9642
40	9315	9377	9436	9492	9546	9596	9644
42	9317	9379	9438	9494	9548	9598	9645
44	9319	9381	9440	9496	9549	9600	9647
46	9321	9383	9442	9498	9551	9601	9648
48	9323	9385	9444	9500	9553	9603	9650
50	9325	9387	9446	9501	9554	9604	9651
52	9327	9389	9447	9503	9556	9606	9653
54	9329	9391	9449	9505	9558	9608	9655
56	9332	9393	9451	9507	9559	9609	9656
58	9334	9395	9453	9509	9561	9611	9658
60	9336	9397	9455	9510	9563	9613	9659

A Table

The Degrees of the Quadrant.

mi	75	76	77	78	79	80	81	82
5	9663	9706	9747	9784	9819	9850	9879	9905
10	9667	9710	9750	9787	9822	9853	9881	9907
15	9670	9713	9753	9790	9824	9855	9884	9909
20	9674	9717	9755	9793	9827	9858	9886	9911
25	9678	9720	9760	9796	9830	9860	9888	9912
30	9681	9724	9763	9799	9832	9863	9890	9914
35	9685	9727	9766	9802	9835	9865	9892	9916
40	9689	9730	9769	9805	9838	9868	9894	9918
45	9692	9734	9772	9808	9840	9870	9896	9920
50	9695	9737	9775	9811	9843	9872	9898	9922
55	9699	9740	9778	9813	9846	9874	9900	9924
60	9703	9744	9781	9816	9848	9877	9903	9925

Degrees of the Quadrant.

mi	83	84	85	86	87	88	89
5	9927	9947	9963	9977	9987	9994	9998
10	9929	9948	9964	9978	9988	9995	9998
15	9931	9950	9965	9978	9988	9995	9998
20	9932	9951	9967	9979	9989	9996	9999
25	9934	9952	9968	9980	9990	9996	9999
30	9936	9954	9969	9981	9990	9996	9999
35	9937	9955	9970	9982	9991	9997	99
40	9939	9957	9971	9983	999?	9997	99
45	9940	9958	9972	9984	999?	9998	99
50	9942	9959	9973	9984	9993	999?	99
55	9944	9960	9975	9985	999?	9998	99
60	9945	9962	9976	9986	9994	9998	10000

The

The Extraction of rootes.

IT is not vnnecessary, before we doe enter into the order and methode of teaching how to extract a roote, to shew the diuers kinds and their definitions: therefore you must know that of Rootes there are sundry sorts, according to the quantities from which they are derived, as the Squares, Cubes, squared squares, Surdsolides, &c. for the numbers receiue their names of the said quantities, euery quantitie hauing his roote which may be called the first quantitie because it is the side or beginning of the quantitie whereunto it is set: Numbers of the second quantitie are called squares, of the third Cubes, of the fourth squared squares as before: wherein you may proceed infinitely if you will, but you shall seldome or neuer haue vse for the extraction of the roote of any quantitie more then Squares and Cubes: A square number is the product of any number multiplyed in it selfe, and the roote thereof is the multiplyer whereby the same square number is produced: as for example, 4. is a square number comming of the multiplycation of 2. in it selfe which is the roote thereof.

A Cubicke number is the product of any number multiplyed into it selfe, and the same product multiplyed againe by the first number: As 2. multiplyed by it selfe is 4. that product multiplyed againe by 2. the first number makes 8. which is a Cubicke number, and the roote thereof is 2.

A squared square number, is produced of 3. multiplications: first any number by it selfe makes a square number, that product againe by the first roote or multiplyer, makes a Cubicke number, and lastly that product againe by the first number or roote, produceth a squared square number, as 2. multiplyed in it selfe makes 4. a square number, that againe by 2. makes 8. which is a Cubicke

number, and then that product again by 2. produceth 16. which is a ſquared ſquare number: & the Roote thereof is 2. A Surdſolide number is the product of any number multiplyed 4. times by the Roote thereof: as 32. is a ſurdſolide number, the Roote whereof is 2. for 2. multiplyed in it ſelfe is 4. that multiplyed againe by 2. is 8. the ſame product againe by 2. makes 16. and laſtly the ſame product multiplyed by the firſt number 2. makes 32. therefore I conclude that 32. is a ſurdſolide number, and the number 2. whereby the ſaid number is produced, is the ſurdſolide Roote to the ſaid number: and thus multiplying the laſt product by the firſt number or Roote, you may proceed infinitely, but more then theſe are needleſſe, and as I ſaid before, without any great or common vſe.

Now for the finding of the Roots, it muſt be done according to the quantitie whereof it taketh Denomination, as whether it be of a Square or Cube, or otherwiſe: which knowne, let vs proceede to the working thereof.

You muſt vnderſtand that the order of extracting the Roote of any quantitie, is not much vnlike to diuiſion, differing onely in this, that whereas in diuiſion the deuiſor is knowne, but heere it is to finde, alſo in Diuiſion you alwayes keepe one deuiſor, but in this, you muſt change your deuiſor at each removing, which is at the finding of euery figure contained in the Roote: Now therefore I will lay downe one generall way for the extraction of the Roote of all quantities whatſoeuer, which is done by certaine numbers applyed to each ſeuerall quantity, which are theſe: For the ſquare roote is one number required, which is 20. For the Cube two numbers, which are 300. and 30. For the Squared ſquare three numbers, viz. 4000. 600. and 40.

Thus hauing declared the kindes, numbers, quantities, and order of the extraction of all ſortes of Rootes, it followeth that we proceede to the practiſe thereof: And firſt to extract the ſquare roote of any number, you muſt conſider as before I haue ſaid, that 20 is the number for the ſame quantitie: Alſo you muſt learne by memorie the iuſt ſquare of all the 9. vnities, which if you know not, this Table will ſtand in ſome ſtead: where you ſee that againſt euery of the 9. vnities aforeſaid towards the right hand is

the

the ſquare of that vnitie againſt which it doth ſtand: which knowne, ſet downe the number whereof you would extract the ſquare rote, then vnder the laſt figure at the right hand, put a pricke, and then proceeding towards the left hand vnder euery ſecond figure put a pricke, that done draw with your pen a quotient as in diuiſion: Now for to finde the rote of your giuen number, ſeeke the greateſt ſquare number contained in the number ouer the firſt prick, that ſquare number taken from the number ouer the ſaid firſt prick, & ſet the remainer ouer it, the rot of which ſquare number put in the quotient for the firſt figure of the rote: that rote multiply by 20. the number for the ſquare rote: and looke how often the product thereof may be take from the number ouer or to the left hand of the ſecond pricke, which put in your quotient for the ſecond figure of your rote: but this is to be noted for a generall rule, that you muſt take no greater number for your ſecond figure, then that the ſquare thereof added with the former product, may be taken from the number ouer the ſaid ſecond pricke: and alſo looke how many prickes are vnder your giuen number, ſo many figures muſt be in the quotient for the rote of the ſaid number: then hauing found two figures in the quotient, if there be any more prickes, multiply the whole number in the quotient by 20. and ſeeke how often the product thereof may be taken from the number ouer or belonging to the next pricke, which number, put in the quotient, and adding the ſquare therof to the former product ſubſtract the whole ſumme from the number ouer the ſaid pricke, and cancelling the ſaid number as at each remoue you muſt doe, ſet the remainer ouer it, and if there be any more prickes vndone, doe as you did before, alwayes multiplying the quotient by 20. thereto adding the ſquare of the laſt figure, and the totall ſumme being ſubſtracted from ỳ laſt remainer, if there reſt nothing, it is a ſquare number or elſe not, which you may proue, if you multiply the rote by it ſelfe ſquarely, for the rot being truly extracted, will produce the firſt giuen number. But becauſe that examples are eaſieſt for the vnderſtanding, let 104976. be the giuen number whereof I would know the ſquare rote, viz. what number

1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81

being multiplyed into it selfe, will product the foresaid number of 104976. Therfore first I set downe ỳ said number and vnder the last figure towards the right hand which in this example is 6. I put a pricke or point, another vnder the 9. and lastly, another vnder 0. leaving one figure betwixt euery prick: which done and the quotient drawne, the giuen number will stand thus: 1 0 4 9 7 6 whereby I see that the Rote of the said number must consist of 3. figures, because it hath 3. prickes vnder it: then I seeke the greatest square number in 10. it being the number belonging to the first pricke towards the left hand, that I finde to be 9. which is produced of 3. multiplyed squarely, therefore I put 3. in the quotient for the first figure of the rote, and the square thereof being 9. I substract from 10. the number ouer the first prick, and there rests 1. The order of which worke will stand thus: 1. where you see that the figures ouer the first pricke x 0 4 9 7 6 | 3 cancelled, there is 3. in the quotient for the first figure 9. of the rote and 1. rests, which with the figures betwixt it and the next pricke, makes 149. for the number of the second pricke. Now for the second figure of the rote, I multiply 3. the rote already found by 20. and the product is 60. that I seeke how often I may take from 149. the number ouer the second pricke, which I may doe 2. times, for 2. times 60. is 120. whereunto the square of 2. which is 4. being added, makes 124. that substracted from 149. leaues 25. therfore I put 2. in the quotient for ỳ second figure of the rote, and cancelling the figures ouer the second pricke, the remainer being put ouer it, the working thereof will stand in this order: where you see the quotient is 32. for the 2. first figures of the rote, and the figures of the 2. first prickes being cancelled, there restes 25. which with the other figures betwixt them and the 3. and last prick makes 2576. for the number ouer the last pricke: now therefore, to finde the last figure of the rote, I multiply the rot already found, that is to say 32. by 20. and ỳ product thereof is 640. that I seeke how oft it may be

x 25
1 0 4 9 7 6 | 32.
9
124 20
3
60
2
120
4
124

taken

taken out of 2576. the number ouer the laſt prick which may be done foure times, for foure times 640. is 2560. whereunto if I adde the ſquare of 4. there will amount 2576. which becauſe it may be taken from the number remaining ouer the laſt pricke, I put 4. in the quotient for the laſt figure of the roote, and ſubſtracting the former product of 2576. from the number ouer the laſt prick, which is likewiſe 2576. there will reſt nothing, therefore I cancell thoſe figures likewiſe, and thereby conclude 104976. to be a Square number, and 324. to bée the roote thereof: the proofe whereof is by multiplying the roote into it ſelfe ſquarely: for if you multiply 324. by 324. the firſt ginen number of 104976. will be produced, the working thereof will be as aboue you may ſée.

This example in my minde, might be ſufficient with often vſe and practiſe to bring perfection in this kinde of Extractions, becauſe that although the ſomme be neuer ſo great, it is done all by one manner of worke: yet neuertheleſſe, if I did not thinke that thou wouldeſt complaine rather of tedioufnes of learning, then of the difficulty in teaching, I would giue another example for variety of examples makes the worke ſéeme the more eaſie, therefore once againe: let 54867. 30625. bée a ginen number, whereof I would know the ſquare roote: firſt I put prickes or points vnder the ginen number in ſuch order as you ſée, beginning at the laſt figure towards the right hand, and proceéding towards the left, leauing one figure vnpointed betwixt euery prick, where you ſée that the whole ginen number conſiſts of 5. prickes, therefore of ſo many figures muſt your Roote or quotient be: then drawing a quotient, I ſéeke the greateſt ſquare number in 5. which is the number ouer the firſt pricke, which greateſt ſquare number I finde to be 4. and the roote thereof

```
X25
X04976|324
 9
124
 2576
      32
      20
     640
       4
    2560
      16
    2576
     324
     324
    1296
     648
     972
  104976
```

thereof 2. for two times two is foure, therefore I put 2. in the quotient and taking 4. the ſquare thereof from 5. the number over the firſt pricke, there will reſt 1. which I ſet over 5. cancelling the ſaid 5. the working whereof will ſtand as above, then for the ſecond figure of the root I multiply 2. the firſt figure of the roote already found by 20. and the product is 40. that I ſeeke how often may be taken from 148. the number remayning over the ſecond pricke, which may be one 3. times, for 3. times 40. is 120. whereunto the ſquare of 3. being added makes 129. then I put 3. in the quotient for the ſecond figure of the roote, and ſubſtracting 129. the laſt product from 148. the number remaining over the 2. prick, there will reſt 19. which with the other figures betwixt them and the next prick, makes 1973. therefore I cancell the 148. and ſetting ẏ remainer over it, I have 1973. for the number over the 3. prick, and 23. in the quotient for the 2. firſt figures of the roote, now for the third figure of the roote I multiply 23. the roote already found by 20. the product is 460. which may be taken from 1973. the number remaining over the third pricke foure times, for 460. multiplyed by 4. makes 1840. whereunto adding 16. the ſquare of 4. the product is 1856. therefore I put 4. in the quotient for the 3. figure of the root, and ſubſtracting 1856 from 1973. the number over the third pricke, there will remaine 117. which with the other figures betwixt them and the next pricke, makes 11706. for the number over the fourth pricke, and there is in the quotient 234.

$$\begin{array}{l} 1 \\ \cancel{5}48730625 \mid 2 \\ 4 \end{array}$$

$$\begin{array}{r} 20 \\ 2 \\ \hline 40 \\ 3 \\ \hline 120 \\ 9 \\ \hline 129 \end{array}$$

$$\begin{array}{l} \cancel{1}19 \\ \cancel{5}\cancel{4}8730625 \mid \underline{23} \\ 4 \\ \cancel{1}29 \end{array}$$

$$\begin{array}{r} 23 \\ 20 \\ \hline 460 \\ 4 \\ \hline 1840 \\ 16 \\ \hline 1856 \end{array}$$

$$\begin{array}{l} \quad 1 \\ \cancel{1}\cancel{1}\cancel{9}17 \\ \cancel{5}\cancel{4}\cancel{8}\cancel{7}\cancel{3}0525 \mid 234 \end{array}$$

for

for the roote already found, the whole worke ſtanding as aboue: Againe for to finde the fourth figure of the roote, I multiply 234. the roote found, by 20. the product whereof is 4680. which may be taken out of 11706. two times, for 4680 multiplyed by 2. makes 9360. which with 4. the ſquare of 2. makes in all 9364. the ſame being ſubſtracted from 11706. the number remaining ouer the fourth prick, there will reſt 2342. which with the other figure betwixt them and the fifth or laſt pricke, makes 234225. for the number remaining ouer the laſt pricke therefore making my ſubſtraction, I ſet the remainer ouer it, and put 2. in the quotient for the fourth figure of the roote as you may ſée in the margine: then to finde the laſt figure of the roote of this giuen number aforeſaid, I multiply the whole roote already found, viz. 2342. by 20. the product is 46840. which may be taken from 234225. the number ouer the laſt pricke 5. times, for 46840. multiplyed by 5. makes 234200. whereunto if I adde 25. the ſquare of 5. the whole product will be 234225. which number is equall to the number ouer the laſt pricke, therefore I put 5. in the quotient, for the the laſt figure of the root, and ſubſtracting the whole ſumme of the laſt product, viz. 234225. from the number ouer the laſt point or prick, which is likewiſe 234225. there will remaine nothing: whereby I finde 548730625. the giuen number to be a ſquare number, and the roote thereof to be 23425. which is the number found out in the quotient as in this working thereof you may more plainly perceiue.

$$\begin{array}{l} \quad 1 \\ \cancel{1}\cancel{1}\cancel{9}17 \\ \underset{\cdot}{\cancel{5}}\cancel{4}\underset{\cdot}{8}\cancel{7}\underset{\cdot}{\cancel{3}}0\underset{\cdot}{6}2\underset{\cdot}{5}\ |\ \underline{234} \\ 4 \\ 129 \\ \quad 1856 \end{array}$$

$$\begin{array}{r} 234 \\ 20 \\ \hline 4680 \\ 2 \\ \hline 9360 \\ 4 \\ \hline 9364 \end{array}$$

$$\begin{array}{l} \quad \cancel{1}23 \\ \cancel{1}\cancel{1}\cancel{9}\cancel{1}742 \\ \underset{\cdot}{\cancel{5}}\cancel{4}\underset{\cdot}{8}\cancel{7}\underset{\cdot}{\cancel{3}}\cancel{0}\underset{\cdot}{6}2\underset{\cdot}{5}\ |\ \underline{2342} \\ 4 \\ 129 \\ \quad 1856 \\ \qquad 9364 \end{array}$$

$$\begin{array}{r} 2342 \\ 20 \\ \hline 46840 \\ 5 \\ \hline 2342200 \\ 25 \\ \hline 234225 \end{array}$$

For

For proofe whereof, if you multiply 23425. the Roote ſquarely into it ſelfe, the product thereof will be equall to the firſt giuen number, as in this example you may ſée.

$\cancel{1}\cancel{2}\cancel{3}$

$\cancel{1}\cancel{1}\cancel{9}\cancel{1}\cancel{7}\cancel{4}\cancel{2}$

$\cancel{5}\cancel{4}8\cancel{7}\cancel{3}\cancel{0}\cancel{6}\cancel{2}\cancel{5} \mid \underline{23425}$

4
129
1856
9364
234225
23425
23425

117125
46850
93700
70275
46850

548730625

I doubt not but to any indifferent conceit theſe two examples will ſuffice aſwell as if I ſhould contriue a whole volume thereof, when it is ſo that the giuen number is a right ſquare number, but if the giuen number bée not a ſquare number, it is vnpoſſible for to finde an exact roote thereto. but that after the worke, there will remaine ſomething as a fraction or part of a number more to be added to the quotient: for the true and perfect valuation of which fraction or remainer, none as yet could attaine, but they haue ſet downe ſo néere a way for the extraction of the roote of any number not being a ſquare number, that thereby no great error may be perceiued: For the knowledge and better vnderſtanding of which, let this be a familiar example: you know that 16. is a right ſquare number, and the ſquare root thereof is 4. but if you would extract the ſquare root of 18. you ſhould haue 4. in your quotient likewiſe for the roote thereof, but then there will reſt 2. whereby you ſée that 18. is no ſquare number, neither can you know what fraction to make of it by reaſon that you haue no certaine deuiſor, which might ſtand for denominator to the numerator or remainer: onely let this ſuffice, that to finde the neareſt Roote there, the rule is thus: double the remainer for the numerator and quadruple; viz. multiply the Root by 4. and thereto adde one for the denominator to the ſaide numerator, as in this example to extract the neareſt Square roote of 18. I finde 4. to be in the quotient, and 2. remaining, which 2

2

$\cancel{1}8 \mid 4.\frac{4}{17}$

16

being doubled, makes 4. for the numerator, and 4. the roote being multiplyed by 4. makes 16. and one added thereunto with, makes 17. for denominator, whereby I say that 4. $\frac{1}{17}$. is the neareſt ſquare roote of 18. which may be found out, for if you reduce $\frac{1}{17}$. into one common denomination, and then multiply them ſquarely, the product will be 17. $\frac{15}{17}$. which is but $\frac{1}{17}$. too little.

Thus hauing declared the order how to extract the Square roote of any number: it reſteth now that I ſhew the manner of extracting the Cube roote of any number: as for the principall vſes thereof, you ſhall finde in the generall practiſe of the Mathematickes.

To finde out the Cube root of any giuen number, being a right Cube number, Firſt put downe the giuen number, and as in the ſquare number you put pointes or prickes, beginning at the right hand and ſo towards the left, leauing betwixt each point one figure voide, ſo in the extraction of the roote of a Cube number, you muſt leaue two figures void or vnprickt betwixt euery point, and as in the ſquare roote, ſo likewiſe in this: loke how many pointes are vnder the giuen number, ſo many figures muſt be contained in the rote thereof, which is alſo to be obſerued in extracting the roote of any quantity whatſoeuer: theſe thinges being conſidered, it is alſo neceſſary, that you know the greateſt Cubicke number of euery of the 9. vnities, whereof the Table here vnder ſpecified maketh explanation: where you ſée that againſt each vnitie, ſtandeth the Cube number thereof, which

1	....	1
2	....	8
3	....	27
4	....	64
5	....	125
6	....	216
7	....	343
8	....	512
9	....	729

béing knowne, and the giuen number prickt, with a quotient drawne as before I haue ſhewed: to extract the Cube root, you haue two numbers, viz. 300. and 30. but becauſe the working thereof would be too long to expreſſe in tearmes, let 13824 bée a giuen number, whereof I would extract the Cube roote.

Firſt I put down that number aforeſaid, with pointes vnder it, and a quotient in this order, 13824. whereby I ſée that the Roote thereof muſt conſiſt of two figures, becauſe ſo many points doe

belong

belong vnto the giuen number, for the first figure whereof I seeke the greatest Cube number contained in 13. the number ouer the first point towards the left hand, which I finde to be 8. the Cube roote thereof, which is 2. I put in the quotient for the first figure of the roote, and subtracting 8. from 13. rests 5. which I put ouer 13 cancelling the said 13. which done, the worke will be as below.

How for to finde the second figure of the roote, I set downe the two numbers which serueth for the extraction of the Cube roote: viz. 300. 30. and against 30. I put the roote already found, which is 2. and against 300. the square thereof which is 4. these 2. figures I set towards the left hand of them, then I multiply 300. by 4. the figure which standeth against it, and the product is 1200. that I seeke how often I may take from 5824. ỳ number ouer the second prick, which I may doe 4. times, therefore I put 4. in the quotient for the second figure, and vpon the right hand against 300. I set 4. the last found number in the quotient, and against 30. I put 16. the square thereof: and vnderneath 30. I put 64. which is the Cube of 4. then multiplying all the figures which are in a rowe into one product viz. 4. by 300. makes 1200. and that againe by 4. makes 4800. for that product: then for the nert 2. by 30. makes 60. and that by 16. makes 960. for the second product, which I set downe together, each vnder other. Lastly because 64. hath no other number to be multiplyed therewith, I put that downe vnder them, which done I add them all together, and the totall summe is 5824. the same subtracted from the number ouer the last pricke, leaueth nothing, whereby I see that 13824. is a Cubick number, and the

5
13824 | 2
· · —
8

4· ·300· 4·
2· ··30· 16
64

30
2
———
60
16
———
360
60
———
960

300
4
———
1200
4
———
4800

4800
960
64
———
5824

Cube

cube root thereof, is 24. as you may more plainly ſée by the working thereof, which is put in the margine aboue, where you ſée, that 24. being multiplyed into it ſelfe, and that product again by 24. the firſt multiplyer, yͤ product is 13824. which is equall to the firſt giuen number.

5
~~1~~~~3~~8~~2~~~~4~~ | 24
8
5824

24
24
96
48
576
576
24
2304
1152
13824

Againe, ſéing that examples are the eaſieſt Methode of teaching; and plaineſt for vnderſtanding: let 12551868224. bée a giuen number: Whereof I would extract the Cube root: firſt hauing prickt it and drawne a *Quotient* for the roote thus 12551868224. I ſée that yͤ roote muſt conſiſt · · · · of 4. figures, ſo many pricks being vnder the giuen Number. For the finding of which figures, I ſéeke firſt the greateſt Cube number, in 12. which is 8. yͤ root whereof being 2. I put in the *Quotient*, for the firſt figure of the root ſubſtracting 8. the Cube thereof, from 12. the number ouer the firſt pricke, reſts 4. then for the ſecond figure of the roote, I put downe 300. and 30. the numbers for the Cube roote; againſt 30. I ſet 2. that roote found: and againſt 300. 4. the *Square* thereof: and *multiplying* 300. by 4. the *Product* is 1200. that may be taken out of 4551. the number ouer the ſecond prick 3. times therefore I put 3. in the *quotient*, and likewiſe after 300. and yͤ *ſquare* thereof which is 9. after 30. and the cube thereof which is 27. I put vnder 30. then I *multiply* all the numbers in the firſt row, each by the other, viz. 4. by 300. makes 1600. and the ſame *product* againe by 3. makes 3200. which I ſet by it ſelfe: then againe I *multiply* 2. by 30. is 60. and that againe by 9. makes 540. which I put vnder the other *Product*; laſtly, becauſe 27. hath no number wherewith to be multiplyed, I ſet downe likewiſe vnder both the other and the 3. numbers being ſet in order one vnder another, as you ſée, I adde them all together, and the whole *Product* is 4167. the ſame I ſubſtract from 4551. the number ouer the

4
~~1~~~~2~~551868224 | 23
·   ·   ·   ·
8
4 300 3
2 30 9
27

3600
540
27
4167

next pricke, and there will remaine 384. to ioyne with ẏ number ouer the 3. pricke: which done, the worke will stand in this order as you see. Now for the third figure of the roote, I put downe 300. and 30. as before, and against 30. at the left hand put 23. the roote already found, and against 300. the *square* thereof, which is 529. then *multiplying* 529. by 00. the *Product* is 158700. which may bee twise taken frome 384808. therefore I put 2. in the *Quotient*, for the third figure of the roote, and likewise put 2. to the right hand of 300. and the *square* thereof which is 4. at the right hand of 30. and the Cube thereof being 8. I put vnder 30. which numbers will stand as aboue; then *multiplying* all the numbers in one rowe each by other, into one *Product*, viz. 529. by 300. makes 158700. and that againe by 2. is 317400. for the whole *product* of that rowe, which I set downe by it selfe; then I *multiply* 23. by 30. is 690. and that againe by 4. is 2760. for the *Product* of the second rowe.

Lastly, because 8. hath no number with it, I put it downe vnder the other, and then adding all the three summes together, the *Product* is 320168: the same taken from 384868. the number ouer the third pricke, rests for the number ouer the last pricke, 64700224. and in the *Quotient* is 232. the whole worke being as you see aboue.

4	3	8	4
x	x	x	8	6	8	2	4	2
.	.	.	.					
8								
4	1	6	7					
			529			300		
			23			30		
								2
								4
						8		
					3	1	7	4	0	0
						2	7	6	0	
								8		
				3	2	0	1	6	8	
			6							
4	3	8	4	7	0	0				
x	x	x	8	6	8	2	2	4		
.	.	.	.							
8						2	3	2		
			4	1	6	7				
					3	2	0	1	6	8.

Now to finde the fourth and last figure of the roote, I put downe the two numbers againe, which serue for the Cube roote, viz. 300. and 30. At the left hand of 30. I put 232. the number in the *Quotient*, and at the left hand of 300. I set the *square* of 232. which is 53824. in this order: Then *multiplying* 53824. by 300. the *Product* is 16147200. which I seeke how often may be had in 64700224. the numbers remaining ouer the last pricke, that may be done foure times: Therefore I put 4. in the *Quotient*, for the fourth and last figure of the Roote, and also I set

53824	300
232	30

the

the ſaid 4. at the right hand of 300. and the *ſquare* thereof which is 16. at the right hand of 30. and the Cube thereof being 64. I put right vnderneath 30. which done all the numbers will ſtand as aboue: Then *multiplying* all the numbers in each rowe, into their ſeuerall *Products*; viz. 53824. by 300. makes 16147200: that againe by 4. is 64588800. which I ſet by it ſelfe: Then againe 232. by 30. is 6960. the ſame *Product* by 16. makes 111360. which I put downe vnder the other.

Laſtly, becauſe 64. hath no other number to be *multiplyed* therewith, I put it downe likewiſe, vnder the other two numbers, and adding the three *Products* together, the whole ſumme therof will be 64700224. which being ſubſtracted from the number remaining ouer the laſt prike, leaues nothing: So haue I in the *Quotient* 2324. for the Cube roote of 12551868224. the giuen Number: the whole worke whereof is heere ſet downe in the margine. For the proofe whereof, If you *multiply* the Roote: viz 2324. Cubickly in it ſelfe, the *Product* thereof will be equall with the firſt giuen number, as in this example.

Where you ſee, that 2324: the Roote being *multiplyed* into it ſelfe Squarely, and then likewiſe the whole *Product* thereof againe by the ſame Roote, 2324. The totall Summe amounting thereof, is 12551868224. the firſt giuen Number.

But when you haue a number giuen to extract the Cube roote, and the aforeſaid giuen number, be not a right Cube number, whereby you cannot come to any perfect Roote thereof, but that there will remaine

53824 ··· 300 ·· 4
232 ··· 30 ·· 16
64

64588800
111360
64

64700224

6 ·
4384700
x x x x 8 6 8 x x x 4
· · · ·
8 |2324
4167
320168
64700224

2324
2324

9296
4648
6972
4648

5400976
2324

21603904
10801952
16202928
10801952

12551868224.

remaine some fraction or broken number after your said extracti-on, onely the manner to extract the néereſt roote of a number not Cubicall, as moſt writers doe affirme is thus.

The difference betwixt the Cubick number of the root, and the cubick number of a number more then ỹ Root, by an unity, ſhall be the Denominator to the remainer, 1. alſo added therto: As for Example.

Let 12. be a Number giuen, which not being a right Cube number, I would finde the néereſt roote thereof. Firſt the greateſt Cubicke number in 12. is 8. the Cube roote whereof being 2. I put in the quotient, and ſubſtracting 8. the cube therof from 12. there will reſt 4. which 4. being ouer, ſheweth that 12. is no Cubicke number: therefore adding 1. to 4. makes 5. which I put for the Numerator: and to finde the Denominator thereto, I ſet downe the cube of 2. the roote found, which is 8. and likewiſe 27. the cube of 3. which is a number more then ỹ roote, by 1. then ſubſtracting the one from the other, viz. 8. from 27. leaues 19. for the Denominator: By which reaſon the neareſt Cubicke root, of 12. is $2.\frac{5}{19}$. which being reduced, and multiplyed cubickly, makes $11.\frac{40515}{47475}$. the ſame abbreuiated, makes 11. and very néere $\frac{1}{9}$. and it ſhould be 12. therefore the error is $\frac{1}{9}$. too little; which although in this is no great error, yet in a great ſumme the error would be very much: Therefore for thoſe which deſire a more exact and perfect extraction of the ſquare or cube roote from numbers not being right ſquare, or cubicke numbers: Mr. Record in his Whetſtone of wit, ſetteth downe an exact way (but very tedious) which is thus: For the ſquare roote, adde to the giuen number ſo many times 2. ciphers, as you deſire the néerneſſe of the Roote: And for the Cubicke roote ſo many times 3. ciphers, as you deſire the exactnes of the Root thereof: and vnder the ſaid Ciphers, put Pricks, in ſuch order as before is taught; and then marke how many pricks there is ouer, and beſides the pricks of the giuen number: And then extract the Roote from all thoſe ciphers in ſuch order as you did before; for if there be one more, the Root ſhall be tenths, and the remainer parts of $\frac{1}{10}$ if there bée two points or prickes ouer, more then the giuen number, then the Roote ſhall be hundreths, and the remainer parts of $\frac{1}{100}$ if 3. prickes be ouer, the Roote ſhall be thouſands, and the remainer parts of $\frac{1}{1000}$. and ſo you may come to a very

very néere roote but not to any exact or perfect roote, vnlesse the gi' uen number bée a right square or Cubicall number.

A Declaration of the Tables of Longitude and Latitude of places following.

The Tables hereafter following, shewing the Longitude and Latitude of places, viz. of Kingdomes, Prouinces, Cities, Iles, Capes, Bayes, Riuers, and Mountaines, especially the most principall of them in the whole world, are gathered from the latest Descriptions, Maps and Charts, as well vniuersal as particular: who albeit they differ greatly in Longitude, yet in Latitude most of them agrée: and also hauing a respect to the beginning of each of their seuerall Longitude, they come all to a néer agrément: For some beginning their Longitude at the westermost part of Africa, makes the Longit. of London to be about 10. degrées 20. minutes: others beginning at the Canary Ilands, makes the Longitude of London 18. degrées: others more westward make it 19. degrées 30. minutes, and Iodocus Hondius beginning the Meridian at the Ile Pico one of the Azores, makes London to be in Longitude 27. degrées 40. minutes: but I following Mr. Emery Mulineux, according to his great Globes, doe account the Longitude from the westermost parts of S. Michaels, another Ile of the Azores, the midst of which Ile is 50. minutes in Longitude and from the westermost part thereof, the Long. of London is 25. deg. 40. min. which in effect is not much different from any of the others: note that the Long. is counted from the Meridian, passing ouer the aforesaid place Easterwards into a continuall progression, to the end of 360. which is the whole circumference of the world: Latitude is counted from the Equinoctiall to the end of 90. deg. on each side thereof: and where the letter S. is after any number, it shewes the place to haue so many deg. and min. of South Lat. all the rest hauing no letter adioyning haue N. Lat. the whole being set in Alphabeticall order, for the readier finding of any place therein contained: and where the Longi. and Latit. of any Kingdome is set downe, noted by this sillable Reg. it expresseth the middle thereof. Further, at the end of such places as begin with one letter, is left a space wherein the Traueller may insert such places whereof the Longitude and Latitude is to him knowne, and not herein expressed.

¶ A Table of the Longitude and Latitude of all the Notable places of the world.

A	Longi.	Latit.		A	Longi.	Latit.	
A Berden	22 21	57 21		Algaziu	16 0	29 1	
A Abo	47 51	61 1		Algiery	33 1	35 21	
Abragima	156 1	32 41		Alguecet	63 41	26 51	
Ælabrigo	187 11	3 29	S	Alicante	28 41	39 1	
Acapulco	276 1	18 1		Alicoa	7 41	13 21	S
Acartij an Iland	329 1	52 1		Alicur	44 21	38 29	
Azores an Iland	357 1	39 1		Alima	108 51	31 1	
Achaguas	101 30	5 30	S	Alleluia	70 21	10 1	
Achea	132 30	4 40		Almedina	34 1	33 41	
Aden	84 2	13 51		Almiria	26 11	37 21	
Adia	50 11	25 1	S	Alpes a mountain	41 29	47 29	
Adu	105 41	5 41	S	Alsigubas	147 11	38 41	
Ægypt	64 3	30 1		Amazen	45 29	12 41	
Africa reg.	40 1	10 1		Amazons Reg.	323 1	13 1	
Agonata	162 21	38 1		Las Amazona	312 29	12 29	S
Agragam	144 29	8 21	S	Amnion	59 41	27 11	
Aguada	173 51	7 51	S	Amara	63 30	5 0	
Aguada segura	253 29	24 1		Amara	60 10	19 20	S
Aqua la de pozos	245 20	28 0		Amsterdam	33 1	51 29	
Alina a mountain	98 41	54 20		Anafi	19 15	33 0	
Alacranes	283 5	22 1		Anarie a mount	116 0	54 29	
Alagoa	58 41	29 41	S	Ancona	63 11	1 11	
Albion noua	235 1	50 0		Ancona	43 29	43 51	
Albiron	109 29	25 29		Ambomo	162 50	4 20	S
Albofera	35 21	8 1		Ambon	164 30	3 40	S
Alboram	25 29	35 29		Amiona	75 20	12 40	S
Albrough	26 25	52 20		Andernopoly	58 11	44 41	
Alepo	72 29	38 1		S. *Andra*	170 29	12 1	
Alcada	23 4	40 29		S. *Andre*	22 11	56 21	
Alexandria	65 1	31 21		S. *Andreas*	62 11	61 11	
Alexandria	108 11	36 21		Las a negadas	296 0	50 1	S

A	Longi.	Latit.	
Angier	24 41	47 35	
Anglesey	19 51	54 0	
Anglia Reg.	23 0	53 0	
Angolesme	27 1	46 0	
Anda	66 0	8 10	S
Angolia	45 10	7 10	S
Angos	69 10	15 50	S
Angote Reg.	67 1	1 6	
Annibily Reg.	134 11	63 0	
Antiochia	72 30	39 0	
Antiochia	300 50	6 40	
Antipara	74 20	25 20	S
Antwerpen	31 20	50 30	
Apiamia	61 30	43 40	
Aqua lega	86 40	9 50	S
Ara	14 20	55 10	
Arabia felix	83 0	21 0	
Arabia desert	77 0	30 0	
Aracam Reg.	132 0	25 0	
Arboledas	272 30	25 30	
Ardaguy	136 20	5 10	S
Aren	76 10	5 10	
Argell	84 30	15 0	
Arglas	16 30	54 20	
Armenia Reg.	76 0	41 0	
Arnoltus mount	35 0	11 30	S
Ascention	353 20	18 50	
La ascention	15 30	8 0	S
Ascention	290 30	29 30	
Asia Reg.	130 0	55 0	
Asmery mount	137 0	50 0	
Aspesa	52 15	44 20	
Aspeza mount	100 0	50 40	
Asiria Reg.	85 0	36 0	
Astapus fluui	64 0	4 0	
Asuga	66 40	7 20	

A B	Longi.	Latit.	
Atacama	303 30	32 0	S
Atalaya	383 0	20 10	
Atalaia	291 0	29 40	
Atalaia	27 50	6 20	
Ataualo	298 10	1 30	S
Athens	56 10	40 0	
Auero	17 30	41 10	
Augustine	293 0	29 50	
Auignon	32 40	44 40	
Aulona	51 20	41 40	
Ausburgh	38 40	48 30	
Ayaman Reg.	82 0	25 0	
Azabar	75 30	51 20	
Azamor	18 30	32 40	
Azasy	17 15	32 10	
Azura a mountain	59 0	22 40	
Azzell	62 40	1 30	S
Amiens	28 30	49 40	
Arago	26 0	42 0	

B

Bantam	140 0	5 40	S
Babilon	82 20	33 0	
Babell mandell	80 0	12 50	
Bachu	88 50	42 0	
Bachnapa	72 0	4 0	S
Bactriana Reg.	115 0	38 30	
Badasos	19 40	38 30	
Basar	52 20	11 40	S
Bagasus a lake	77 10	50 40	
Baharam an Ile	87 20	27 30	
Bayes			
Bayanegada	319 50	40 20	S
Bay de baxos anegados	321 30	39 50	S
Bianza	149 25	3 0	S

B	Longi.	Latit.	
Buena baya	190 20	4 40	S
Bay de los cõdos	320 20	3 0	
Bay a dalagoa	56 10	32 10	S
Bay de fumos	240 20	36 0	
Bay degent grand	303 0	14 0	S
Bay Hermoſa	54 20	32 40	S
Bay S. Iohan	309 40	40 30	
Bay de S. Migell	39 30	8 40	S
Bay Oceſinora	312 30	41 0	
Bay de pinos	233 0	44 30	
Bay langos	18 0	37 30	
Bay de ſaluadeges	344 0	20 0	S
Bay de S. Sebaſtiã	83 20	13 20	S
Bacalaio	335 4	48 28	
Bay da reg.	126 0	65 0	
Bayona	17 20	42 10	
Bayone	25 30	44 0	
Balgada	69 30	5 0	
Balſera	82 40	31 10	
Bamberg	39 15	50 10	
Banda	162 0	4 50	S
Bandu	173 30	33 0	
Bax de los pergos	345 30	20 0	S
Bianza	150 0	2 50	S
Barbada	320 50	19 50	
La Barbada	192 50	1 50	S
Barbados	320 20	17 40	
Barlingas	16 20	39 30	
Barnagaſſo reg.	70 0	13 0	
S Bartholome	194 30	14 0	
Baſell	37 10	47 50	
Beciaſa	65 0	10 30	
Becolicus a mont	56 0	26 30	
Beil	76 15	27 10	
Belef	69 0	51 40	
Belle Ile	334 0	52 20	

B	Longi.	Latit.	
Beliſſe	21 40	17 0	
Belt	52 30	50 0	
Bengala neg.	126 0	26 30	
Benichao	136 0	3 50	
Benin regnum	41 0	7 40	
Bepirus à mont	143 0	34 0	
Bepirus a Riuer	138 20	34 0	
Berga	40 10	62 50	
Bergen	30 30	60 50	
Berwicke	22 50	55 50	
Bethle	138 50	25 40	
Baiſer regnum	50 0	4 0	
Braligrod	58 20	47 30	
Bilbao	23 30	43 0	
Blaskey	12 0	51 40	
Blanes	31 10	42 0	
Blauet	21 15	47 50	
Bloe	5 30	67 0	
Borno Regnum	48 30	17 10	
Borutholme	40 50	55 30	
Bouenbergen	34 20	56 30	
Brandenberge	42 30	52 50	
Braſill	5 10	51 20	
Braſilia regnum	345 0	10 0	S
Braua	74 30	0 30	
Breſt	20 0	48 30	
Breſt	331 0	53 0	
Bruage	25 30	45 50	
Bruges	29 0	51 10	
Buda	48 0	47 20	
Burdeaux	26 0	45 10	
Briſtow	22 50	51 35	
Brachipult point in Wales	21 25	53 0	
Backapra	31 0	59 50	
Bruſſels	30 50	51 0	

C	Longi.	Latit.	
Barcelona	28 15	41 10	
Burlings.	16 0	39 38	
C			
Capes			
CApe S.Francis	335 0	48 5	
cap de Eſpera	335 5	47 0	
Cape Raſo	334 40	46 28	
Cape Maſſiſaco	24 0	43 32	
Cape de las penes	21 0	43 35	
Cape de Alinde	346 50	1 0	
Cape del Amber	85 30	12 0	S
Cape de S. Anton	289 15	22 50	S
Cape Cleare	14 10	51 9	
Cape de S. Antoni	74 30	17 0	S
Cape de S. Auguſt	162 0	6 30	
Cape de S.Auguſt	354 0	8 30	S
Cape baxo	328 0	4 20	
Cape de las baxas	19 41	15 29	
Cape bedford	320 1	65 29	
Cape blanco	273 19	25 21	
Cape blanco	281 19	10 29	S
Cape blanco	330 11	1 1	
Cape blanco	331 21	4 29	
Cape blanco	334 21	52 1	
Cape blanco	9 20	20 29	
Cape blanco	289 41	2 21	S
Cape blanco	151 1	22 41	
Cape braua	275 1	27 29	
Cape de breton	331 1	45 41	
Cape cameron	287 21	25 41	
Cape comorin	115 15	7 30	
Cape cantin	17 1	32 11	
Cap de S.catherin	41 1	1 1	S
Cap de cro	31 29	42 11	
Cap croce	65 21	48 21	

C	Longi.	Latit.	
Cap de ferro	281 21	29 21	
cap de ſperance	324 29	58 1	
cap de ſ.domingo	315 21	46 41	S
cap droſey	13 1	51 11	
cape feare	305 11	32 29	
cape Felix	84 29	14 11	
cap finis Terre	16 1	43 11	
cap Florida	293 21	25 29	
cap formoſo	28 1	5 1	S
cap froward	302 39	53 21	
cap de gato	26 39	36 51	S
cap de S.Helena	326 11	36 11	
cap de ſantiago	309 1	37 29	
cap S.Iohn	62 29	67 29	
cap de Krin	13 1	53 41	
cap de S. maria	77 29	24 1	S
cap de maio	82 52	15 51	S
cap de S.maria	327 11	35 11	S
cap de S, maria	9 41	21 41	
cap de la mola	36 51	6 29	
capo de nombre de Ieſus.	308 11	53 1	
cap Ortegall	18 29	44 11	
cap de palmas	348 11	1 19	S
cap S. Paul	32 0	5 50	
cap de peſcadores	277 40	28 0	
cap del plate	352 50	5 0	S
cap primero	42 30	2 20	S
csp de 3 pointes	28 30	50 20	
cap de puntas	315 20	10 40	
cap S. Roman	296 40	31 40	
cap de Razo	334 30	46 20	
cap ſalida	74 0	26 10	S
cap de ſpigiel	353 20	7 20	S
cap de ſtauola	12 20	54 0	
cap de tiburones	302 0	17 0	

C	Longi.	Latit.	
Cap Toriga	11 30	18 20	
cap de las vacas	53 0	33 40	S
cap la vela	305 10	11 50	
cap S. Vincent	302 20	53 40	S
cap de virgin mar.	308 0	52 10	S
cap de vittoria	297 30	52 0	S
cap S. Paul	32 0	5 50	
cap de peſcadores	277 40	28 0	
cap del plate	352 50	5 0	S
cap primero	42 0	2 20	S
cap paſſaro	46 29	36 51	
cap raſalgate	96 21	22 21	
cap raſo	317 41	8 0	
cap Roxent	16 29	18 51	
cap roxo	11 1	12 0	
cap of good hope	50 29	34 40	S
cap del ſpirito ſan	161 11	13 11	
cap S. Vincent	17 0	37 0	
cap Verd	9 51	14 29	
cap de bóna viſta	334 21	49 11	
cap Walſingham	321 1	63 41	
Camdu reg	136 1	47 0	
Cairo	67 29	30 0	
Calamita	67 41	48 10	
Caldy	20 1	51 40	
Calecut	112 41	10 29	
Callice in France	29 10	50 40	
Calibia reg	42 10	36 20	
California	245 0	30 0	
Camanor	300 20	16 30	S
Cambaba	150 0	8 10	S
Camboa	19 20	8 30	
Camboya reg	142 20	11 40	
Capiapa	304 50	34 0	S
Caſma a Riuer	121 40	61 0	
Caſtrum portugal	57 10	20 20	S

C	Longi.	Latit.	
Cazan	86 20	56 30	
Chaga	56 0	6 20	S
chialo	56 20	7 0	S
chilimazata	294 30	6 30	S
chio	58 30	40 30	
chiguiſamba	305 30	17 0	S
cirut	62 40	15 30	S
coale	65 0	21 30	
coila	48 20	3 10	S
cora	85 10	19 20	
coronades	295 30	45 0	S
corongo	302 40	14 20	S
corpo ſanto	84 10	7 30	S
cumana	313 30	7 0	
cuſco reg	297 20	13 30	S
cales in Spaine	20 51	36 10	
cambalu	161 11	51 40	
cana	68 1	25 40	
canada	305 11	50 21	
canaria	9 29	27 21	
candia	59 29	35 21	
caraiam regnum	136 51	41 0	
caribanum reg	310 1	5 0	
caribes	316 11	7 0	
cartagena	300 1	11 20	
cartagena	28 21	38 20	
cartago	299 29	3 11	
caſena reg	38 21	17 11	
caffar reg	132 1	47 1	
cataio reg	150 1	53 1	
catnes	22 9	58 29	
catwicke	41 11	69 11	
ceris	87 51	38 41	
cheſimur reg	115 0	29 0	
cheſter in England	21 29	53 51	
chicheſter	24 11	51 0	

C D	Longi.	Latit.	
Chidlies cape	326 41	67 29	
Chily reg	305 0	30 1	S
Chirman reg	96 0	26 29	
Ciartiam reg	136 29	51 1	
Cinua	67 1	41 21	
Cirena	53 29	32 0	
Ciprus	68 40	37 30	
Clearmont	30 55	45 51	
Cocas a mountain	79 0	47 29	
Cochin	114 0	9 14	
Collao reg	310 0	16 0	S
Colmogory	62 41	63 41	
Colne	34 0	51 41	
Commania reg	86 0	51 0	
Congu	147 21	49 11	
Coninxberg	49 11	55 29	
Conſtantinople	61 10	44 40	
Coppen hage	38 29	55 51	
Corafau reg	108 1	37 0	
Corke in Ireland	15 41	51 41	
Corfu an Iland	22 0	39 29	
Corinth	54 21	39 0	
Corſica	38 11	42 0	
Cotum reg	130 0	51 0	
Cracow	48 29	50 0	
Cuba	296 0	31 41	
Ear. of Cumb. Iles	316 0	63 21	
Cuſitan reg	87 0	32 0	
Conough	15 35	53 45	
Cambridge	25 50	52 14	

D

DAngali Reg.	78 0	11 0	
Dangara	53 50	10 50	S
Dauma reg	34 20	8 0	
Debſan	52 10	13 30	S
Dembia	56 0	3 0	S

D E	Longi.	Latit.	
Dwina	74 30	62 10	
Dageroort	48 41	59 41	
Dalacia	77 0	14 21	
Damaſcus	74 29	35 0	
Dantzick	46 0	55 0	
L. Darcies Ile	327 51	68 21	
Deliy reg	114 0	18 29	
Derwinda	47 51	57 29	
Deuenter	33 25	51 51	
Diep	28 41	49 29	
Dires cape	321 29	64 51	
Dominica	319 41	14 0	
Don a Riuer	75 0	53 21	
Donecz a riuer	71 0	51 0	
Dorow	58 0	51 29	
Douer	28 11	51 0	
Drongenes	4 29	66 29	
Drin	50 0	45 0	
Dubdu	25 0	32 51	
Dubino	35 21	54 0	
Dublin	16 41	53 11	
Dumaran	150 0	8 41	
Duy	34 29	59 21	
Duyhe	56 29	50 29	
Dams ſtraights	324 1	64 0	
Darby	24 5	52 55	
Dunkerke.	29 10	51 12	

E

EBaida	60 1	25 29	
Ecſonen	30 15	58 11	
Edenbrough	22 1	55 51	
Elgent	80 0	17 20	
Ely	25 20	52 40	
Eliobon	72 0	27 0	
Elior	26 20	10 10	
Qu. Eliza. forland	337 0	61 30	

E F	Longi.	Latit.
Emden	34 10	53 10
Ens	43 0	48 30
Ens	74 10	37 30
Epheſus	60 30	39 40
Ergas	86 0	38 0
Ergimul	45 0	59 0
Euboya	56 10	41 0
Euphrates	76 40	40 0
Europa reg.	55 0	51 0
Exeter	22 10	50 0
Enchuiſen.	21 40	52 54
F		
FAlckzin	57 20	47 0
Falſterhode	40 0	56 0
Famagoſta	69 20	57 30
Farrallones	294 20	11 40 S
Fargana	114 40	46 0
Farre	16 20	61 30
Cape Fatache	86 50	15 40
Faſo	75 50	45 40
Farnaſa	38 10	30 10
Fayll	356 0	38 40
Fernandobucke	351 40	9 20 S
Fees reg.	21 50	32 50
Fierro	6 20	26 30
Finmarke	47 0	69 30
Flambroughead	20	54 0
Flensburgh	36 40	55 0
Fleccory	32 0	58 0
Flye	32 0	53 33
Florence	41 10	43 40
Flores Iland	353 40	39 20
Florida reg.	292 0	31 0
Focen	38 40	46 30
La Formanos	310 30	60 40
Formentera	31 10	38 50

F G	Longi.	Latit.
Forteuentura	0	28 30
Foyl	15 50	55 30
Frayles	314 30	11 20
Franckfort	36 30	50 0
Friſland	351 30	62 0
Frobiſhers ſtay	331 20	64 0
A furious ouerfall	322 30	60 0
Farre Ilands	20 0	62 10
Farhill Ile	24 45	60 0
G		
GAgo regnum	25 0	8 30
Galathia	37 20	37 0
Gambra a riuer	12 0	13 10
Gane	30 20	50 40
Garamantica	51 30	16 0
Garnſey	22 20	49 40
Gaza	70 50	33 10
Gamba	64 40	17 30 S
Gargiza	72 40	12 0 S
Gemanacota	118 40	6 0
Geneua	33 40	46 20
Genua	37 50	45 0
Genua	15 20	16 0
Gerguth reg.	153 0	57 0
Germanarco	40 0	51 0
Gerſeluin	24 30	32 20
Geſtreg	106 30	26 0
Genera	7 30	26 30
Ghir a riuer	25 30	22 0
Ghir a deſert	24 0	22 0
Giamber	18 1	33 41
Gilan	94 1	39 21
Gilberts ſound	326 51	67 1
Giras a riuer	41 21	20 11

G	Longi.	Latit.	
Galloway	15 49 53 15		
Goa	112 21 14 41		
Godia	22 30 18 11		
Glosgow	29 0 57 0		
Golfo de benngal	125 0 15 0		
Golfo de s.Helen	48 41 33 29	S	
Golfo de la India	44 21 3 41	S	
Golf: de los negi	350 30 2 0	S	
Golfo del Rey	40 41 5 30	S	
Golfo de todos Santos.	345 30 1 41		
Golfo de s.Anton	46 20 26 0	S	
Golfo frio	45 30 20 0	S	
Golfo delpapagai	278 30 12 30		
Gorage Reg.	69 0 2 0		
Goram	58 15 28 30		
Goteland	45 21 57 30		
Gozo	58 20 34 41		
Granda	318 20 11 0		
Granata	23 30 38 0		
Gretia Reg.	54 0 40 0		
Gratiosa	357 30 39 2		
Groninghen	32 11 53 0		
Groenland	0 0 75 0		
Groy	21 0 47 21		
Guber Reg.	27 0 9 0		
Guangera Reg.	44 0 13 41		
Gudan	48 21 8 51		
Guinea noua	80 0 5 0		
Guinea Reg.	18 0 9 0	S	
Gulye	33 30 50 41		
Gunagona	67 20 6 0		
Gustina	109 30 56 11		
Gibralter straights.	21 30 35 2		

H I	Longi.	Latit.
HAles Iland	337 51	63 0
Haliber	78 41	21 10
Hallicz	52 51	48 41
Hambrough	37 11	53 21
Hartlepole	24 0	55 21
Harwich	27 29	52 0
Hauana	292 11	20 0
Hebrides	15 20	58 0
Heydelberg	36 0	49 0
Heist	23 29	46 29
Heisshant	19 29	48 41
Heptapolis	324 29	25 21
Hercules pillars	69 21	32 11
Helichland	33 51	66 0
Hercania Reg.	100 0	40 0
Hispanio Reg.	25 0	40 0
Noua Hispanio	280 0	13 29
Hispaniola	306 0	18 29
Holindall	36 11	51 1
Homey	61 30	52 51
Hontsoort	48 30	59 1
Horne	12 10	56 10
Hull	25 21	53 41
Hungaria	50 0	48 1
Hidaspes a Riuer	124 0	33 21
Hipasis a Riuer	124 0	33 1
Helin head	15 2	55 15
Hereford	12 38	52 12
Heel of danthick.	46 10	55 40

I		
IAcuby a Riuer	64 1	8 1
Iadye	58 21	1 41
Iamaica	298 30	17 0
Iasques in Persia	44 0	25 40

I	Longit.	Latit.	
Iambut	72 20	26 29	
Iorchem reg.	117 29	44 1	
Iapones	169 0	3 1	S
Iarsey Iland	23 0	49 20	S
Iaua maior	140 0	9 0	
Iaua minor	150 0	9 0	
Iazin	77 30	20 30	
Iapara	141 20	7 40	
Ierico	73 1	33 0	
Ieruſalem	72 21	33 0	
Ilmens a Riuer	105 0	27 0	
Imaus a Mountaine	128 0	39 0	
India Orientall	135 0	26 0	
Indus a Riuer	115 29	26 0	
Inſpurg Ilands	40 41	47 50	
The three Ilands	169 21	40 9	
Ile d'eaues	310 30	11 20	
Ile des eaues	173 50	4 30	
Ile de baſtinado	293 30	10 30	
Ile braua	1 20	12 20	
Iſlas de corales	194 40	9 50	
Ile deſierto	178 0	31 1	
Ile del Fuego	22	14 21	
Ile de los fuegos	181 29	22 41	
Ile del los Galopegos maiores	281 10	4 0	
Ile de los Galopegos minores	277 30	1 10	S
Ile de Hombres blancos	169 20	5 41	
Ile de *S. Iago*	158 20	8 1	
Ile de *S. Iuan*	325 29	42 30	
Ile de *los Ladrones*	177 21	15 1	
Ile de *los Lobos*	307 41	40 21	

I	Longit.	Latit.	
Ile de *S. Maria*	196 29	37 2	
Ile de martin vaz	10 41	21 1	S
Ile de May	4 29	13 29	
Ile *S. Michael*	0 0	29 29	
Ile de Negros	155 29	10 29	
Iland of Fowles	33 40	50 0	
Ile de Orliance	31 0	50 29	
Ile de Paiaros	314 0	12 41	
Ile de Palmas	163 21	6 0	
Ile de paxaros	198 51	8 51	
Ile de paxaros	234 21	28 0	
Ile of Pearles	203 11	7 0	
Ile de pinos	292 21	21 29	
Ile de rees	1 20	25 21	
Ile of Salt	411	16 29	
Salomon Iland	204 40	10 0	
Ile of the Sunne	547 41	10 29	
Ile *S. Thoma*	38 0	0 0	
Ile *S. Thomas*	252 0	20 11	
Ile de verde	353 51	45 29	
Ile de S. *Vincent*	175 50	8 0	
Ile de S. *Vincent*	73 21	20 29	
Ile de S. *Catalina*	334 10	27 30	S
Ile de Cedros	240 30	29 50	S
Ile de farnan. laro	354 20	2 20	
Ile de lima	295 10	22 0	S
Ile ſecas	46 20	29 30	S
Ile de Triſtan de Acunia	26 30	36 0	S
Ioam	135 0	7 29	
Ioloſo Reg :	24 29	6 0	
Ipſwich	27 12	52 22	
Ioppe	71 21	4 0	
Iſabella	305 21	18 51	
Iſland	8 0	66 0	
Italie Reg:	42 29	43 0	

IKL	Longi.	Latit.
Ireland	16 0	53 29
Iucatan Reg	283 0	18 0
Iugor	138 0	7 50
Iuica	31 21	39 30
Iulibella	61 0	1 30
K		
Almuchy, in Tartaria	9 5	51 0
Kaniow	63 40	51 10
Karakithath reg:	119 0	51 0
Kartzef	67 20	53 0
Kargapele	166 30	61 50
Kasakky Tartaria	103 0	51 0
Kiow	62 20	51 10
Kithais Reg.	110 0	57 0
Kithay a Lake	123 31	53 0
Kola	54 51	69 0
Kolenig	4 11	65 10
Kosara Riuer	96 40	49 0
Kintaile	19 39	56 45
Kinsaile.	15 3	52 35
L		
Lacierna	24 50	39 30
Ladena	53 30	41 31
Ladoga	62 11	61 40
Lago de los Coronados	295 1	44 0

L	Longi.	Latit.
Laia	45 29	64 10
Lampesa	36 21	33 0
Lancerrota	11 41	29 30
Lanow.	51 11	52 20
Laredo	22 51	43 0
Lariſſa	70 0	33 0
Larta	53 0	46 0
Lake de gouleme	306 40	48 0
Lacus Armibus	131 0	60 10
Lacus ſalſus	137 40	47 30
Lecknes	23 29	58 0
Leon	21 11	42 15
Leon	283 41	11 21
Leopolis	52 51	49 2
Lepin	98 0	58 41
Leguio maior	165 0	28 0
Leguio minor	158 41	22 0
Lerida	28 21	41 30
Leſter point	335 0	62 0
Lima	296 41	23 30
Limonia	72 11	44 20
Limoſa	43 29	4 50
Lyons	32 41	45 40
Lyorne	40 21	43 30
Lisboa	17 29	39 11
Lyzard	18 30	50 10
London	25 50	51 40
London coaſt	326 11	72 0
Lepeſe	74 1	49 41
Loyre a Riuer	24 41	47 41
Longſound	34 30	58 55
Lubecke	38 2	53 51
Lucka	42 11	52 0
Luky	64 0	58 21
L. Lumleys Inlet	320 0	61 0

M	Longit.	Latit.	
Luna a mountaine	60 0	16 0	
Lundy	19 2	51 0	
Lutzko	54 0	50 21	
Luſon an Iland	156 0	17 0	
Lybia	33 0	23 30	
Lin	26 25	52 48	
Lincolns.	25 25	53 22	
M			
Mahoga	64 41	13 30	S
Machian	160 41	0 29	
Machoenta	39 51	33 51	
Macſin Ilands	93 30	75 30	
Macyra an Iland	62 0	19 40	
Lamadelena	44 41	7 0	
Madera Ilands	8 11	31 29	
Mæatis palus	71 30	40 29	
Magadaxo	78 0	5 11	
Magalo	71 20	9 29	S
Maida	2 40	46 29	
Magallanes ſtraights	305 0	53 25	
Maiorca Iland	39 31	33 0	
Malibrigo	178 51	26 0	
Malaca reg.	136 30	25 1	
Malaga	23 51	37 21	
Maldanar anIland	113 0	3 0	
Malorca	39 51	32 51	
Malta Iland	46 0	35 31	
Man an Iland	19 0	54 51	
Morigala	66 35	17 30	S
Mogilia	77 26	12 32	S
Membaſa	78 15	3 20	S

M	Longit.	Latit.	
Mauatenga reg.	77 0	22 21	S
Mandao reg.	121 0	25 0	
Mangeſia	61 29	41 29	
Man giorcha	150 0	37 0	
Manica	62 51	23 29	S
Manicongo reg.	46 41	5 0	S
Maniola Iland	140 30	2 0	
Marchant Ile	32 0	68 21	
Mare de bachuor the caſpium ſea	92 0	45 0	
Mare congelatum	345 0	64 0	
Mare de India	120 0	10 0	
Mare maior	68 0	46 0	
Mare mediterranium	50 0	35 0	
Mare rubrum the Red ſea	75 0	20 0	
Mare vermeyo	255 0	26 0	
Mare delzur	220 10	10 0	
Margarita	314 11	0 50	
Marigalante	320 0	13 50	
Marnios	306 21	40 40	
Marrocco	20 0	30 29	
Marcellis	33 51	13 40	
Maſalio	23 29	30 20	
Milford hauen	20 5	51 48	
Maſtagan	30 21	35 2	
Mazaker	167 0	33 0	
Madagaſcar	7 0	19 5	
marae apana	312 10	8 0	
meander a mountaine	152 0	31 30	
maleſtream	6 0	67 22	
meb	46 29	34 40	
medina cely	23 29	41 10	
medina talnaby	73 0	27 20	

M	Longi.	Latit.
Medino	98 29	36 29
Middleburgh	29 40	52 0
Meiſſen	41 0	51 10
Melinde Reg.	71 21	3 20
Melley Reg.	15 41	12 0
Meluing	48 1	54 50
Ments	35 51	50 0
Meſhet	85 29	52 50
Meſopotamia	78 1	35 0
Meſſana	45 51	37 50
Metz	33 29	49 45
Mien Reg.	136 1	31 0
Miens kow	56 41	54 50
Millan	38 29	46 10
Minorca Ile	34 29	40 0
Modon	53 21	37 0
Moguer	20 0	37 50
Moldauia Reg.	55 0	46 0
Molines	30 21	47 40
Mollucca Ilands	160 41	1 0
Memorancie	130 0	47 0
Momphelier	31 29	44 10
Mongull Reg.	160 0	61 30
Monte de branid	47 11	30 15 S
Mont fragoſe	344 0	12 0
Mont negro	44 41	17 0
Mont raleigh	320 20	65 0
Mont royall	301 0	45 40
Morea Reg.	54 30	38 0
Moſaik	68 50	55 0
Moſambique reg	70 20	14 40
Muſcouia reg.	80 0	59 0
Moskow	70 30	55 40
Moſſa	84 30	35 0
Moſull	84 0	34 50
Mozena	24 20	34 30

N	Longi.	Latit.
Minas	0	36 20
Moſeenek	69 50	51 30
Munſter	35 0	52 10
N		
NAbarz	79 50	50 50
Naygay in Tartar	97 0	53 30
Naym	94 10	33 40
Nayman Reg.	140 0	64 0
Naynen	31 10	50 0
Nantes	24 10	47 50
Napoly	45 0	41 0
Napoly	55 10	38 0
Napthaly	73 0	34 30
Narbona	30 20	43 20
Nardenborg	47 10	67 50
Narue	56 10	60 0
Naruare	21 55	42 39
Naſeph	110 30	43 0
Natolia Reg.	66 0	41 0
Nazareth	72 40	34 10
Nerpis	45 30	62 50
Neunox	57 0	64 20
Newcaſtle	23 10	55 20
Nicarea	59 30	39 30
Nicober an Iland	130 30	16 40
Nicomedia	63 30	44 20
Nicopolis	56 30	45 0
Nicflot	57 40	59 50
Nilus a Riuer	67 20	32 0
Ninus	82 20	37 0
Niſa	36 10	44 0
Niſſa	45 30	50 30
Naze in Norway	31 0	58 5
Noes a mountain	81 0	40 21
Nolon	30 0	49 22

N O	Longit.	Latit.		
Nombre de dyos	294 29	9 22		
Nomedalen	33 26	65 29		
Normar	38 2	61 21		
Norombega	315 41	43 41		
Norweigh	35 0	62 2		
Nouogradec	57 11	53 2		
Nowgrod	65 29	52 41		
Nowgorod	62 51	60 29		
Nowgorod	80 2	55 21		
Nubia Reg.	57 2	13 0		
Nubia a Riuer	57 2	15 41		
Nuremberg	39 29	49 29		
Norwich	27 15	52 45		
O				
OBy a riuer	107 1	60 0		
Occa a riuer	77 29	55 41		
Olant	43 29	57 0		
Olleron	24 29	45 29		
Olone	24 29	47 0		
Omagua reg.	130 1	9 0	S	
Omba	54 11	66 51		
Onega a riuer	56 41	64 0		
Onegaburg	59 29	62 29		
Opakow	64 29	53 29		
Orchades Iles	22 11	59 2	S	
Orellana	343 11	3 2		
Orixa reg.	119 1	19 2		
Orleaus	28 29	48 2		
Ormus Ile	93 21	27 29		
Orsa	59 51	54 21		
Orsa	41 21	61 29		
Ortona	44 29	42 40		
Otronto	49 29	40 21		
Oxenford	24 0	52 0		
Oya reg.	75 0	13 0		

O P	Longit.	Latit.		
Ostend	29 29	51 29		
Orenge	30 35	43 35		
Orlyance	27 52	47 42		
Oldsound	31 36	61 35		
Orfordnes	28 0	52 15		
P				
PAganſa	99 51	45 0		
Paito	290 30	5 10	S	
Palagoſa	47 29	43 0		
Palandura Iland	10 8	11 0		
Palatia	60 51	39 21		
Palma Iland	6 21	28 0		
Palona	105 10	2 0	S	
Pancer	120 0	41 0		
Pampalona	24 29	42 41		
Panama	394 29	8 11		
Pantanalia	42 50	36 29		
Panuco	270 10	22 20		
Pauia	270 11	22 21		
Patricks purgato.	15 52	54 32		
Parris	29 25	48 29		
Parma	39 20	45 11		
Paſſan	41 50	48 41		
Paura	37 51	46 11		
Paznaſu	155 29	45 51		
Pechora	66 51	67 0		
Pechora Caſtle	73 51	64 51		
Pegu Reg.	135 0	20 11		
Peim Regnum	132 0	51 29		
Perigo	323 11	43 21		
Pernou	53 29	58 41		
Peru Reg.	296 0	10 0	S	
Peruſia	142 21	43 11		
Peſcara	34 29	30 11		
Phillippina Iland	158 1	15 0		
Palimbam	124 40	7 30		

P	Longi.	Latit.	
Pico	356 41	38 21	
Picora Regnum	317 0	10 2	S
Pigmea	148 41	32 2	
Pinisko	55 0	52 2	
Pilingu	144 21	40 2	
Pina	296 21	3 1	
Pineglc	131 21	52 29	
Pinego	61 11	64 29	
Pinga	101 40	14 20	S
Port de los leenes	318		
Piramides	173 11	20 21	
Pisa	40 29	43 41	
Pizan	73 0	51 29	
Plata	315 0	19 51	S
Plimouth	21 11	50 51	
Ploosko	48 11	52 41	
Plotzko	57 29	57 41	
Podolia Reg.	59 0	49 29	
Poictiers	26 29	47 21	
Poldauid	20 5	47 55	
Polonia Reg.	53 1	50 0	S
Poparopo an Ilād	128 41	16 29	
Buen porto	177 21	2 0	
Port de canoas	239 21	36 41	
Port de caualos	283 0	14 21	
Port de la conce	45 41	4 21	S
Port desire	313 0	47 41	S
Port famin	302 51	53 11	S
Port fremo	44 0	4 0	S
Port del gado	42 11	3 51	
Port de S. Miguel	240 29	35 2	
Port de Negrillo	296 51	17 11	
Port sallido	186 41	3 0	S
Port santo	10 0	32 29	
Port S. Vincent	337 21	23 51	
Praga	42 29	50 0	

P Q R	Longi.	Latit.	
Preslaw	45 11	51 11	
Preslaw	49 41	49 45	
Postland	22 40	50 40	
primsberg	48 30	55 11	
Prussia Reg.	50 0	54 0	
ptolomais	66 41	29 40	
punto del gada	85 51	11 0	
punto de s. Helen	290 11	2 11	S
punto de s. Helen	325 21	37 30	S
punt de s. Lucas	252 29	23 29	
Q			
Q Vanzu	157 29	44 10	
Q Quelinsu	158 29	36 1	
Quiansu	144 41	42 29	
Quiloa Reg.	69 51	8 51	
Quinzay	153 0	40 1	
Quito	293 11	0 11	
Quiuira	233 0	43 40	
R			
R Agusy	49 29	44 1	
R Rameses	68 29	30 30	
Rane	352 41	62 41	
Rauenna	42 21	44 21	
Rhodes	61 41	37 21	
Ryanrech	94 41	40 0	
Ribadeo	19 21	43 21	
Riga	53 30	58 0	
Reins	30 35	49 12	
Riuers			
Rio de arboledas	331 41	1 41	
Rio de S. August.	350 0	15 30	S
Rio de S. Barbara	326 41	34 1	
Rio del Brasill	348 21	17 11	
Rio de los camarones	42 0	5 2	

R	Longit.	Latit.	
Rio de camaron	315 0	44 29	S
Rio del campo	42 29	2 51	
Ria de cano	298 41	33 11	
Rio dangla	42 29	0 41	
Rio dulce	316 29	52 0	
Rio de S. demingo	353 0	7 51	
Rio del eſtremo	340 41	22 59	S
Rio de Flores	287 19	29 0	S
Rio del gado	34 21	6 21	
Rio de gigantes	278 29	29 0	
Rio grande	301 11	11 0	
Rio grande	314 29	44 0	
Rio del guato	284 29	29 29	
Rio de la hacha	304 15	10 41	
Rio de S, Helena	348 41	10 29	S
S. Laurence Riuer	318 51	53 0	
Rio de manicong	48 21	10 0	S
Rio del oro	10 21	22 29	
Rio de palmas	272 11	14 21	
Rio panuco	271 51	22 29	
Rio de perla	292 29	29 0	
Rio de la plata	326 29	36 0	
Rio primero	327 41	45 0	
Rio ſanto	300 29	3 0	S
Rio de ſpirito ſan.	381 29	31 0	
The white Riuer	308 11	51 21	S
Rypon	35 29	55 21	
Roan	27 41	48 51	
Rochell	25 29	46 41	
Romey	42 29	42 0	
Rooſwicke	40 21	54 0	
Roſtone	72 11	57 0	
Ruſſia	57 29	59 29	
Rye	27 29	1 1	
		5	

S	Longit.	Latit.	
SAbarza	154 51	45 0	
Sableſtan Reg.	114 0	34 0	
Sabron	84 51	45 11	
Saendebar	174 41	35 51	
Sagatin	95 29	58 21	
Sala	49 41	48 0	
Salamanca	20 29	40 51	
Salaſta	72 41	41 51	
Salabrema	24 51	37 29	
Salina	45 0	38 29	
Salsburg	42 0	48 21	
Salſtom	32 21	62 0	
Saluado	321 21	5 0	
Samarchant	109 0	44 0	
Samaria	72 21	47 41	
Sanderſons Tow.	320 0	55 29	
Hope Sanderſon	326 21	72 41	
Sandry	162 51	53 0	
Sanſon	20 41	43 21	
S. Crux	334 21	43 29	
S. Dauids	20 0	52 0	
S. Domingo	307 11	17 51	
S. George	357 11	39 0	
S. Helena	24 29	16 0	S
Santiago	264 29	20 29	
Santiago	298 11	32 11	
S. Iago	175 29	2 0	
S. Iohn de luz	25 11	43 21	
S. Lazaro	71 0	11 21	S
S. Lucar	21 21	37 11	
S. Lutia	0 1	17 0	
S. Malo	24 21	48 50	
S. Maria	82 29	17 0	S
S. Maria	240 41	34 21	
S. Maria	0 19	56 0	
S. Maries	85 1	44 29	

S	Longi.	Latit.	
S. Maries of Naz.	66 30	16 29	
S. Martha	301 21	10 41	
S. Martin	321 11	51 0	
S. Martins Iland	293 40	46 51	S
S. Mathewes	21 11	1 51	S
S. Michel	60 50	65 29	
S. Michael	0 50	38 5	
S. Miguel	327 21	47 21	
S. Miguel	291 41	6 11	S
S. Miguel	268 0	24 0	
S. Miguel	249 0	32 51	
S. Nicholas	69 0	54 0	
S. Nicholas	323 21	53 41	
S. Nicholas	2 2	17 0	
S. Petro	64 29	0 29	
S. Pol de Lyon	20 41	48 48	
S. Sampson	306 29	40 29	
S. Vincent	0 29	17 29	
S. Vincent	318 41	11 51	
Sapom Iland	107 11	0 29	
Sarachy	84 29	44 11	
Saragosa	26 11	41 51	
Sardinia	39 0	40 0	
Satyres Iland	174 11	46 30	
Sauatapoly	75 29	47 21	
Scarbrough	24 51	54 51	
Schotland	25 0	60 0	
Scotland	20 0	57 0	
Segedin	49 0	47 11	
Seames	19 29	48 21	
Senega Reg.	13 0	24 0	
Sernery Reg.	106 29	33 29	
Shaboglisher	83 41	56 29	
Shahaskik	91 29	53 0	
Shrewsbury	22 35	52 55	
Shensk	68 40	61 51	

S	Longi.	Latit.	
Skalholt	8 30	65 20	
Sibie[illegible]g.	99 20	59 30	
Sicilia	45 0	37 30	
Sidon	72 10	36 30	
Sigistan Reg.	105 0	31 0	
Simiso	69 10	44 21	
Siam	140 0	13 49	
Sina a mountaine	75 0	20 0	
Sinus mexico	280 0	26 0	
Sinus persia	85 0	29 0	
Sion	59 10	12 40	
Sipanto	45 30	41 50	
Stuill	18 6	37 45	
Slaba	55 50	58 41	
Slauonia	47 0	45 0	
Slego in Ireland	15 35	54 15	
Slowoda	68 20	64 30	
Slowoda	86 30	58 51	
Slutzk	59 0	52 58	
Smirna	60 21	40 29	
Snauell	2 30	64 21	
Solangi Reg.	139 0	50 0	
Solosky	55 0	64 21	
Sorlings	18 0	50 0	
Spacado	46 50	45 21	
Spier	35 30	49 21	
Spina	60 50	43 29	
Stad	30 40	61 41	
Stapholt	2 20	65 41	
Stetin	42 10	53 51	
Stoby	52 30	44 0	
Stocholme	42 0	58 11	
Straights of Tumachin	74 30	73 11	
Seuedia Reg.	40 0	60 0	
Sumatra an Iland.	134 0	0 0	

S T	Longit.	Latit.		T	Longit.	Latit.	
Saldania bay	39 45	34 0		Theſſalonia	53 44	44 21	
Silly	18 0	[illegible] 0		Texell in Holland	31 0	53 15	
Stert	22 50	50 40		Tholomon	144 20	40 0	
Sweſt	64 51	52 11		Tholouſe	28 40	43 50	
Swineburne head	25 0	59 51		Thunnis	67 40	32 0	
Siria	74 0	39 0		Tigris a Riuer	84 0	34 30	
Siracuſæ	45 41	37 0		Tocros	54 50	46 0	
Southampton.	24 5	51 11		Togora	146 0	49 50	
T				Tolledo	22 20	39 40	
TAbaco	322 11	10 41		Tollon	34 5	43 20	
Tacan	152 21	48 51		Toul	33 10	49 10	
Tagaranto	143 29	2 21		Toures	27 30	47 50	
Taguina an Iland	154 29	5 21		Trebiſonde	74 30	44 40	
Taiona	59 29	53 29		Trent	40 10	26 10	
Talabora	312 0	26 21	S	Triago an Iland	278 40	21 0	
Talcan	85 0	47 0		Tribanta	63 30	41 50	
Tamaſa	75 39	46 0		Trin	36 30	45 40	
Taranto	48 0	40 29		Trinidad	355 20	19 10	S
Tarapaca	306 21	30 41	S	Trinidad	295 50	21 20	
Tarbacan	109 29	34 51		Trinidad	319 20	9 0	
Targa Reg.	32 0	25 0		Trinty harbor	308 30	36 0	
Taragona	29 29	40 41		Tripolis antiqua	44 21	30 20	
Tarſo	71 21	40 0		Tripolis in Barba.	45 21	30 30	
Tartar	152 0	63 21		Tripolis ſoria	72 21	37 0	
Tartaria Reg.	130 0	62 0		Troià	59 0	42 30	
Tasken Reg.	129 0	49 0		Troy	31 0	48 10	
Tatracan	55 0	44 51		Tuia	82 51	52 0	
Tellin	13 29	54 41		Tulla	72 0	53 20	
Tenariffe	8 11	27 29		Tuna	41 51	64 30	
Tendue Reg.	170 0	59 0		Tunis Reg.	40 0	36 0	
Teneſab	46 51	61 11		Turſon	131 30	56 30	
Tercera	358 23	39 0		Tyrus	71 35	35 30	
Terra alta	160 29	6 41	S	Tzeroas	79 50	49 20	
Terra alta	45 21	15 21		Talao	159 0	3 30	
Ter de los ſumos	322 29	40 21	S	Ternate	160 12	0 30	
Tharſis	115 21	49 0		Tidore	160 15	0 10	

V	Longi.	Latit.
VArguy	150 50	39 0
Valentia	29 20	39 41
Varcano	107 50	39 0
Varon	83 30	70 30
Vaygats an Iland	81 30	69 21
Venice	41 40	45 51
Verdiso	59 50	45 0
Verdun	32 10	49 20
Verma Reg.	133 0	21 30
Varona	40 40	45 50
Viana	17 30	42 0
Viatca	87 50	59 30
Vich	81 40	53 50
Vienna	45 30	48 30
Villac	48 0	46 50
Villa longa	28 20	7 40
Ville conde	17 30	41 30
Villna	54 30	55 0
Virginia	302 10	36 0
Vissigrod	61 30	51 30
Bona Vista	4 30	15 30
Buena Vista	308 40	40 11
Buena Vista	177 30	13 30
Vkkil	53 10	57 0
Vlm	37 50	48 50
Volga a Riuer	75 40	58 0
Vpsalia	42 50	60 0
Vreamea	23 50	46 0
Vrgis a Riuer	85 50	53 20
Vsting	79 30	61 30
Vstusna	67 0	59 20
Vtuall	42 40	62 50

W X	Longi.	Latit.
WAersberghen	39 1	57 30
Wardhouse	50 30	70 26
Earle Warwickes forland	323 11	92 1
Waterford	17 15	52 16
Count Warwick sound	330 41	64 41
Walkefield	23 48	53 45
Wassilgorod	81 50	56 41
Waxon	49 20	52 29
Weimouth	23 50	51 0
Welichy	96 30	56 0
Weliki poyassa	101 20	63 29
Weliky tumen	95 40	59 21
Welisz	63 40	59 51
Weroy	39 50	98 41
Wesel	21 29	51 29
Westerhol	40 29	97 41
Whitbay	24 29	55 0
Wiborogh	56 29	62 35
Wight Ile	25 11	50 29
S. Hugh Willobie Iland	55 0	75 0
Winterton	27 20	53 29
Wologda	73 50	59 29
Wologda	74 30	60 0
Woilok	68 31	55 50

X

XAiel	85 30	15 41
Xandu	108 40	55 41
Xancs	311 30	11 1
Xaques	282 0	20 29
Xara	130 0	17 1

X Y Z	Longi.	Latit.	
Xibuar	116 0	46 30	
Xiuxa	301 30	12 30	S
Xumcte	304 20	23 0	
Y			
Yarmouth	27 30	53 0	
Yorke	23 30	54 29	
Yuagua	303 30	21 0	
Yuch cope	22 56	56 20	
Z			
Zacabadera	140 40	13 11	
Zacana a riuer	60 40	13 0	S
Zacatula	269 40	20 0	
Zacoton an Iland	88 0	12 51	
Zagatai	105 0	45 0	
Zahaſpa	101 20	42 29	
Zalinca	51 0	58 26	
Zama	49 30	14 0	S

Z	Longi.	Latit.	
Zama	74 41	11 41	
Zanhaga Reg.	20 0	24 0	
Zanziber	73 52	5 29	S
Zaphalonia	52 0	38 29	
Zara	46 25	45 41	
Zaradrus a riuer	126 0	94 0	
Zauan	41 29	51 0	
Zebeng	138 41	35 41	
Zebil a mountain	47 0	17 0	S
Zedica	48 0	29 29	
Zegzeg Reg.	36 41	14 41	
Noua Zembla	83 29	74 0	
Zerigo	56 0	36 0	
Zigeck	45 51	40 51	
Zimbaos	59 0	25 21	S
Zingis	76 11	49 29	
Zodiala	57 51	4 0	S
Zoidalanel	137 31	3 51	S
Zuenziga Reg.	25 0	25 0	
Zuiarzko	85 21	56 0	
Zumball	39 31	37 30